

Internet Access Services: Status as of June 30, 2019

Industry Analysis Division
Office of Economics & Analytics
March 2022



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SECTION 1: OVERVIEW & HIGHLIGHTS

Introduction

This report summarizes information about Internet access connections in the United States as of June 30, 2019 as collected by FCC Form 477. For purposes of this report, Internet access *connections* are those in service, over 200 kilobits per second (kbps) in at least one direction, and reported to the FCC through Form 477.¹

The report includes data on total and residential Internet access connections by downstream and upstream speed, by technology, by geography, and over time. Section 2 of the report presents nationwide statistics, Section 3 provides state-level data, and Section 4 includes data on the subscribership differences among counties and census tracts.² In addition, Section 5 of the report includes an analysis of the correlations between subscribership ratios and various demographic measures.³ Maps depicting the number of fixed connections per 1,000 households by census tract are available online at <https://www.fcc.gov/internet-access-services-reports>.

¹ See the Technical Notes and Glossary at the end of this report for more-detailed information about the Form 477 data collection and the meaning of terms used in this report.

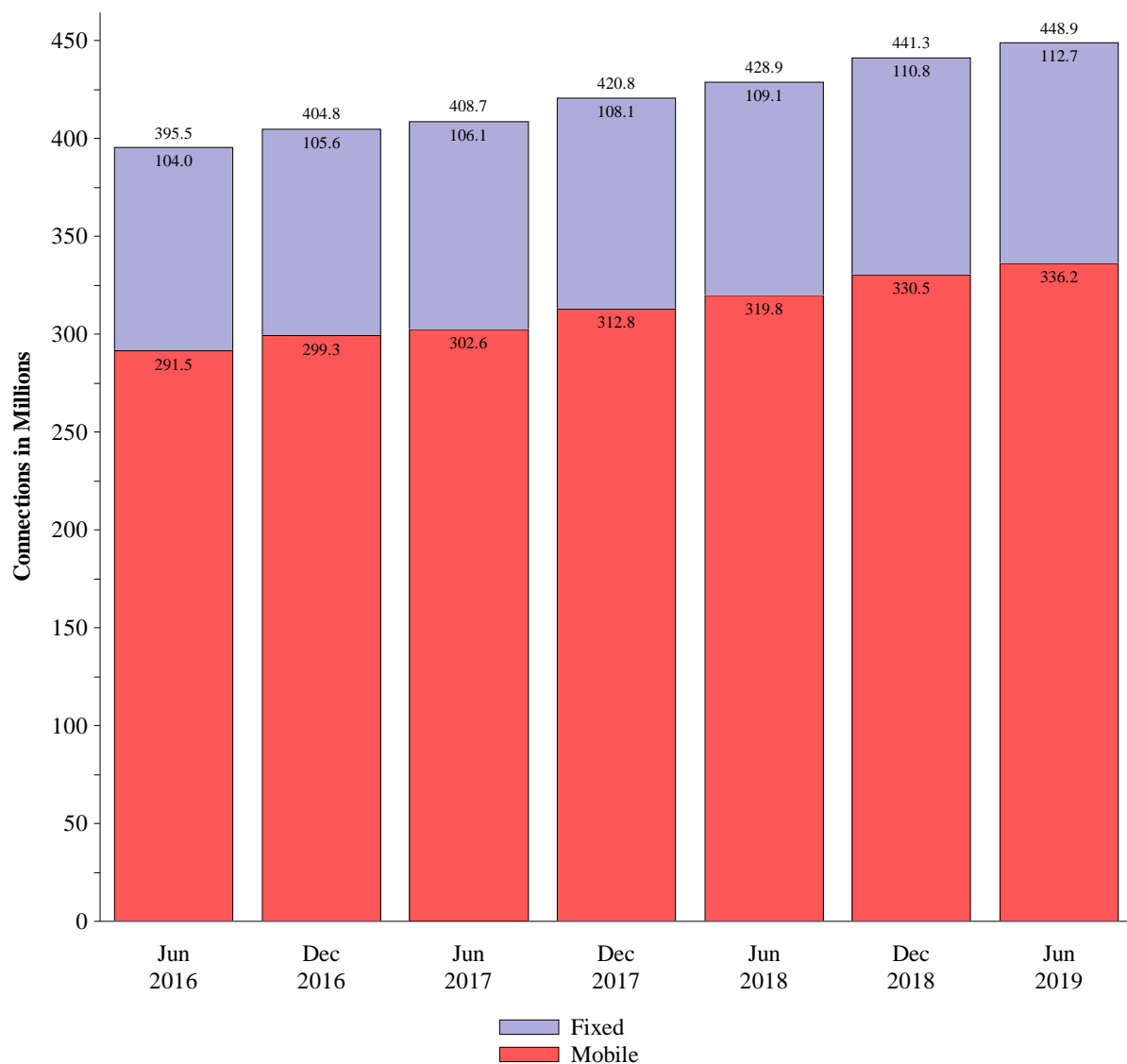
² The Commission began collecting census tract-level data for data as of December 31, 2008. *See High-Speed Services for Internet Access: Status as of December 31, 2008* (February 2010) at 1-4, available at <http://www.fcc.gov/encyclopedia/high-speed-services-internet-access-reports> (December 2008 High-Speed Report).

³ Publicly-available data that are too voluminous to include in this report are available online at <https://www.fcc.gov/general/fcc-form-477-additional-data>.

Total Connections

- As shown in Figure 1, total Internet connections increased by about 4.7% between June 2018 and June 2019 to 449 million. Mobile Internet connections increased 5.1% year-over-year to 336 million in June 2019, while fixed connections grew to 113 million – up about 3.3% from June 2018.
- We believe mobile Internet connections remain underreported by as much as 2% through June 2018 due to inadequate accounting of connections sold by downstream mobile virtual network operators (MVNOs).

Figure 1
Fixed and Mobile Connections 2016-2019

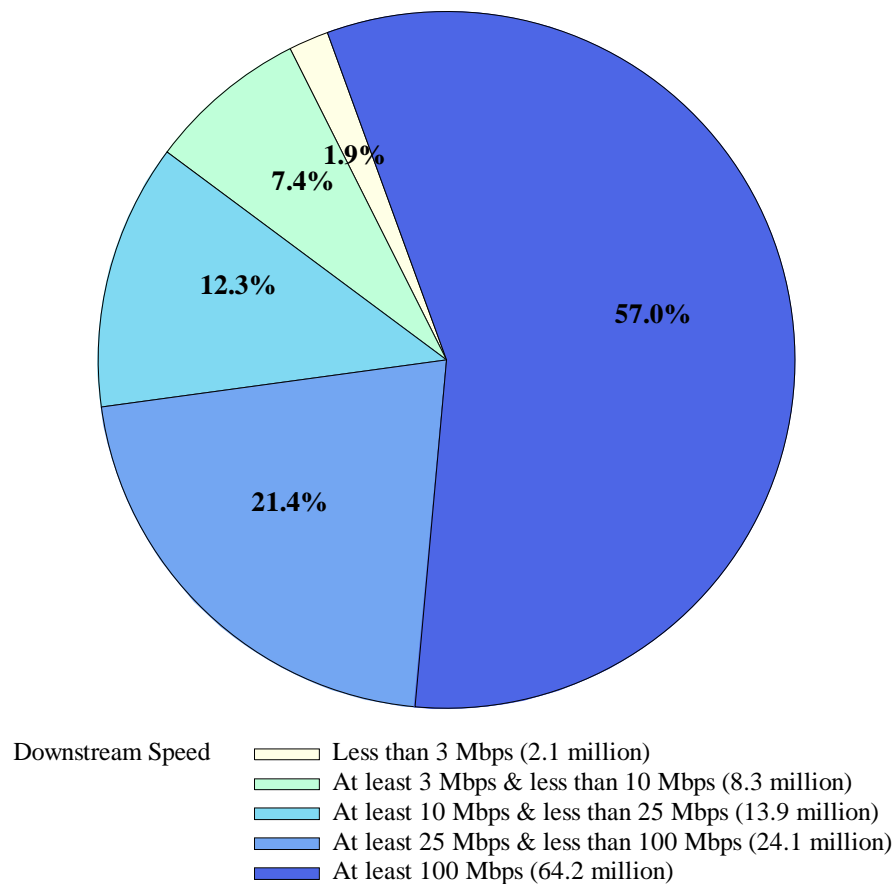


Some previously-published data may have been revised. Figures may not sum to totals elsewhere in this report due to rounding. Connections include both residential and business connections.

Connections by Speed

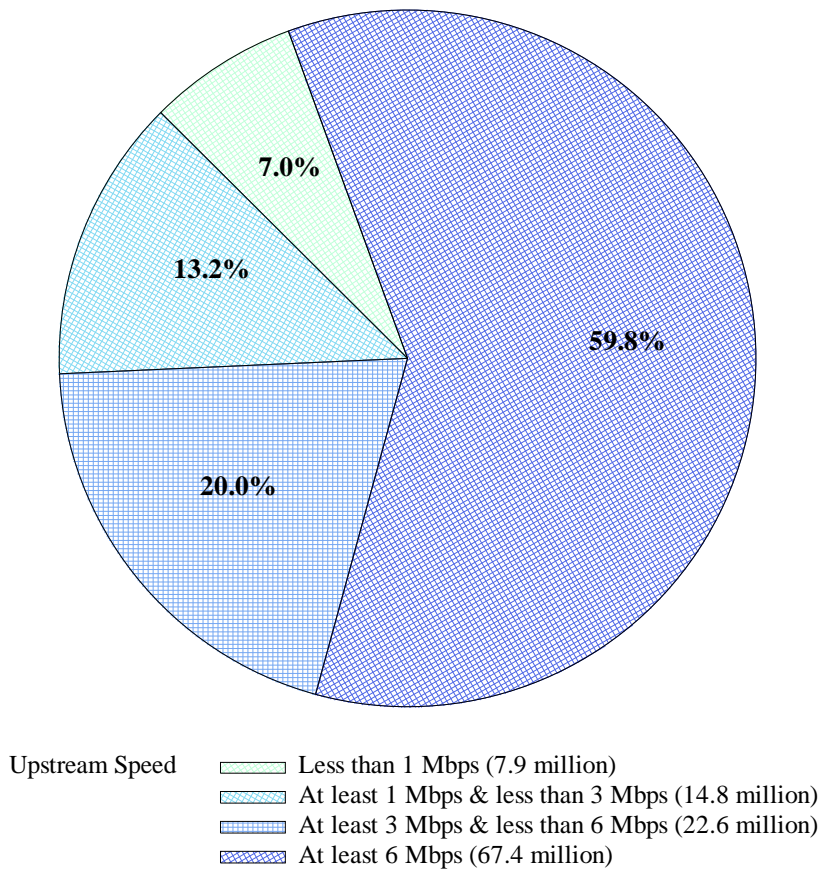
Fixed connections – downstream speeds. Figure 2(a) illustrates how the 113 million fixed connections reported for June 2019 were distributed across the five groups of *downstream speeds* defined by breakpoints at 3 Mbps, 10 Mbps, 25 Mbps, and 100 Mbps. See Figure 9 for more detailed data and cross-tabulations with upload speeds.

Figure 2(a)
Distribution of Fixed Connections (112.7 million) by Downstream Speed
as of June 30, 2019



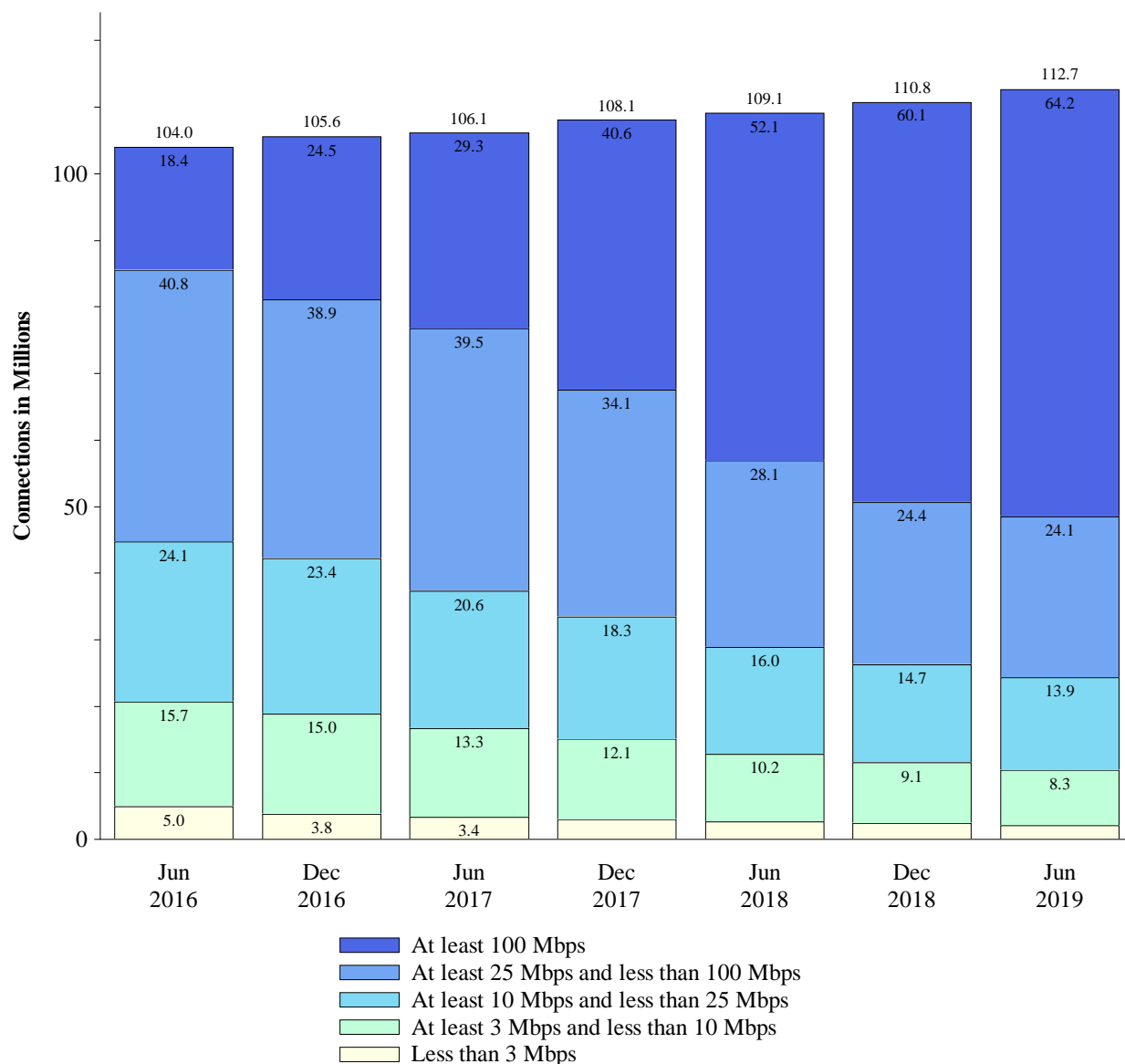
Fixed connections – upstream speeds. Figure 2(b) illustrates how the 113 million fixed connections reported for June 2019 were distributed across the four groups of *upstream speeds* defined by breakpoints at 1 Mbps, 3 Mbps, and 6 Mbps. See Figure 9 for more detailed data and cross-tabulations with download speeds.

Figure 2(b)
Distribution of Fixed Connections (112.7 million) by Upstream Speed
as of June 30, 2019



Fixed connections by downstream speed over time. Figure 3 illustrates how the composition of total fixed Internet connections by different speed groups has changed from 2016 to 2019.

Figure 3
Fixed Connections by Downstream Speed 2016-2019



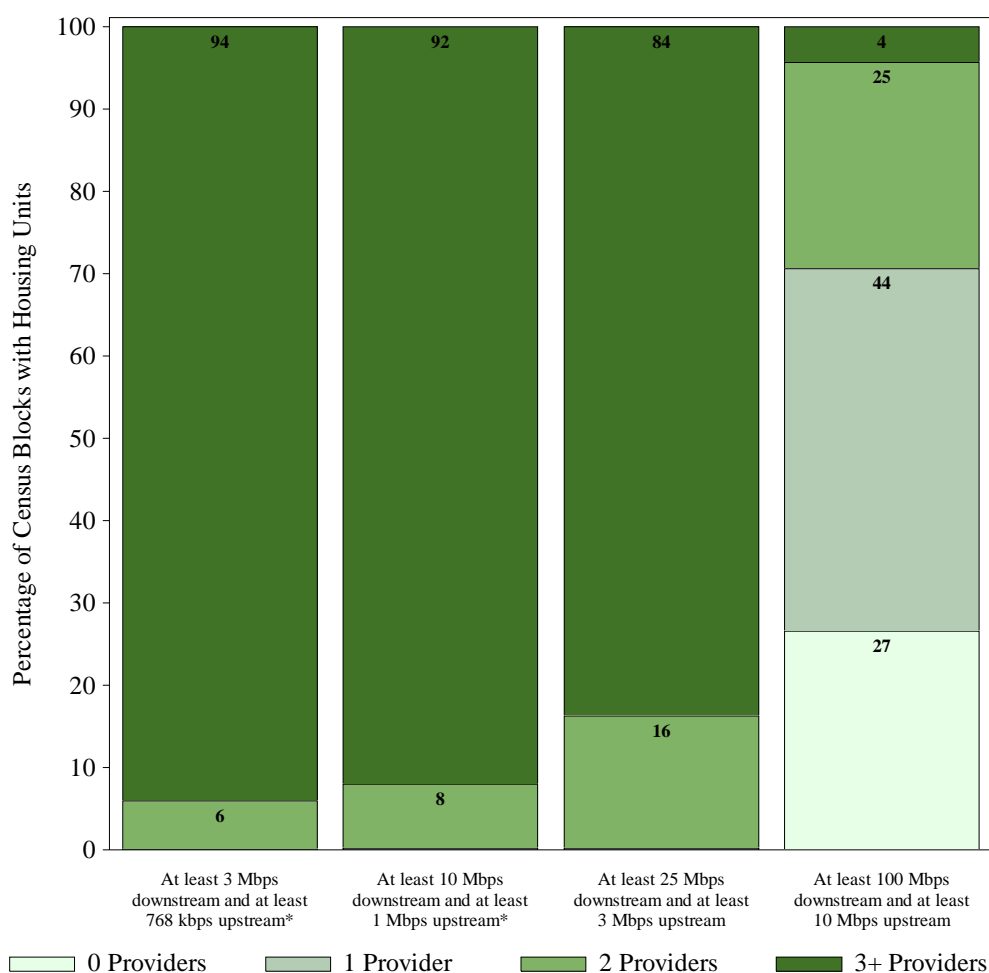
Some previously-published data may have been revised. Figures may not sum to totals elsewhere in this report due to rounding. Connections include both residential and business connections.

- The percentage of fixed connections with a downstream speed of at least 25 Mbps has grown from 57% (or 59 million connections) in June 2016 to 78% (or 88 million connections) in June 2019. Over the same period, the percentage of fixed connections with downstream speeds of less than 3 Mbps has decreased from 5% (or 5 million connections) in June 2016 to about 2% (or about 2.1 million connections) in June 2019.

Number of Providers by Census Block

In Figure 4, we show the percentage of “developed” census blocks – blocks that contain housing units – with zero, one, two, or three or more fixed broadband providers offering residential Internet access service at different speeds in June 2019. This information is taken from the block-level Form 477 fixed broadband deployment data that the Commission began collecting in 2014.⁴ A provider that reports offering service in a particular census block may not offer service, or service at that speed, to all locations in the census block. Accordingly, the number of providers shown in Figure 4 does not necessarily reflect the number of choices available to a particular household and does not purport to measure competition.

Figure 4
Percentages of Developed Census Blocks in which Providers Reported the Deployment of Residential Fixed Broadband as of June 30, 2019



* Satellite service providers are included in this analysis. Satellite service providers report offering Internet access at bandwidths of at least 25 Mbps downstream and 3 Mbps upstream in 99.8% of developed census blocks.

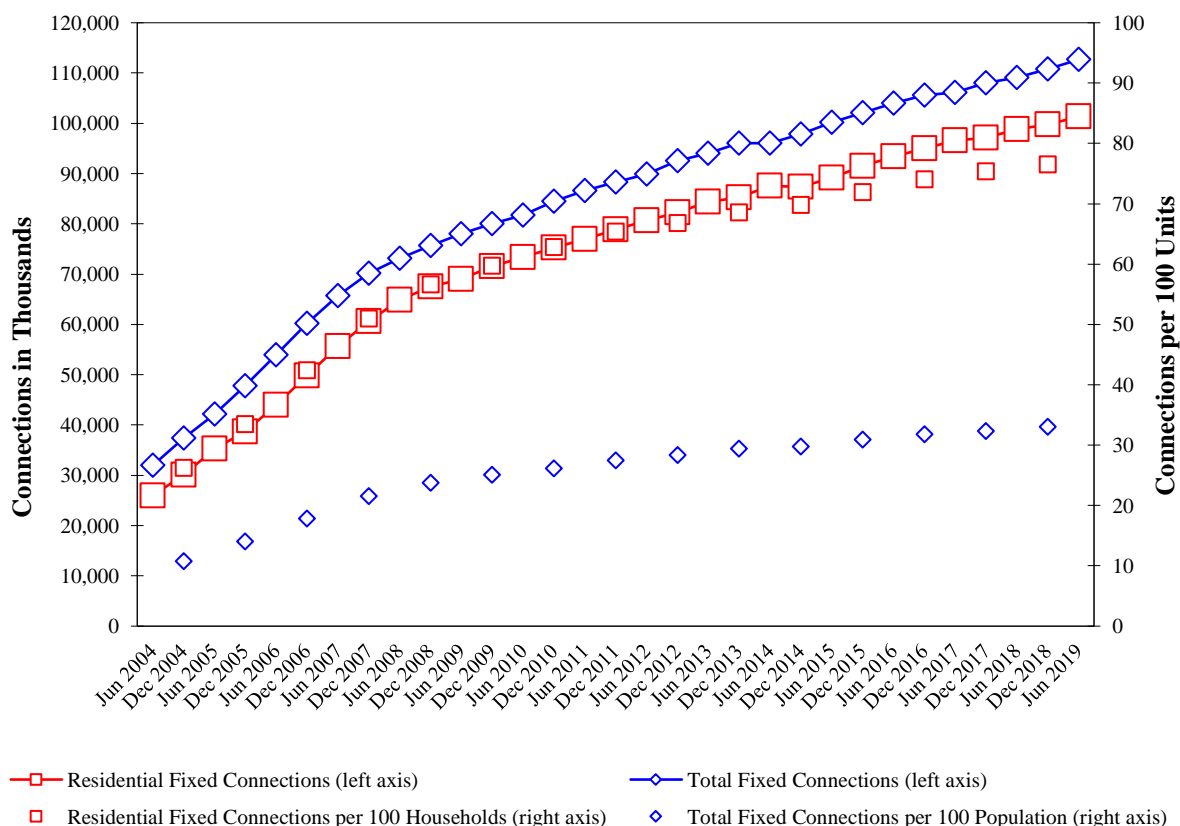
Column figures may not sum to 100% due to rounding. Developed census blocks are those with housing units based on the 2010 census.

⁴ Download these data and explore the interactive map at <https://broadbandmap.fcc.gov/#/>.

Internet Access Subscribership

Figure 5 illustrates the number of total and residential fixed Internet access connections (connections over 200 kbps in at least one direction except mobile wireless connections), as well as the number of total fixed connections per 100 persons and the number of residential fixed connections per 100 households, since 2004.⁵

Figure 5
Fixed Connections 2004-2019
(Connections over 200 kbps in at least one direction)



- Between June 2009 and June 2019, total (business and residential) fixed connections grew from 78 million connections to 113 million connections – at a compound annual growth rate of 4% per year.⁶

⁵ For data through December 2004, only those providers with at least 250 connections in a state were required to report. Historical fixed-location connection counts not included in this report may be found in *June 2008 High-Speed Report* at Tables 1 and 3, available in Excel format at <https://www.fcc.gov/general/reports-high-speed-services-internet-access>.

⁶ The compound annual growth rate (CAGR) is a smoothed rate of growth calculated in three steps: divide the ending value by the beginning value; raise the result of that division to a power equal to one divided by the number of years in the period (in this case, 10 years, so the power is 1/10); subtract the number one from the result of the second step.

- Over the same ten-year period, residential fixed connections grew from 72 million connections to 103 million connections – also at a compound annual growth rate of 4% per year.
- From June 2009 to June 2019, the number of residential fixed connections per 100 U.S. households increased from 60 to 79.⁷

Other Report Highlights

Typical speeds

- The median downstream speed of all reported fixed connections was 100 Mbps and the median upstream speed was 10 Mbps. For residential fixed connections, the median downstream speed was 100 Mbps and the median upstream speed was 10 Mbps.

Residential connections

- Residential fixed Internet access connections increased by about 3.3% between June 2018 and June 2019, to about 103 million. *See Figure 7.*
- Residential (non-business) mobile wireless Internet access connections on mobile devices with data plans for full Internet access increased by about 4.2%, to 270 million, between June 2018 and June 2019. *See Figure 7.*
- Approximately 90% of residential fixed connections had a speed of at least 10 Mbps downstream and 1 Mbps upstream in June 2019, while 78% had a speed of at least 25 Mbps downstream and 3 Mbps upstream. About 59% percent of all residential fixed connections had a downstream speed of at least 100 Mbps. *See Figures 10 and 27.*
- As a national average in June 2019, there were about 76 residential fixed connections with speeds of at least 10 Mbps downstream and 1 Mbps upstream per 100 households; 66 residential fixed connections with speeds of at least 25 Mbps downstream and 3 Mbps upstream per 100 households; and 45 residential fixed connections with speeds of at least 100 Mbps downstream and 10 Mbps upstream per 100 households.⁸ *See Figure 32.*

⁷ We calculate residential fixed connections per 100 *households* using, in the denominator, U.S. household estimates from the Census Bureau’s Current Population Survey (CPS) for July of each year and, for Puerto Rico and the other inhabited island areas, Census 2010 households for 2010 and later years and Census 2000 households for the earlier years. (The CPS also estimates U.S. households for March and November of each year.) Figure 5 also shows total (business and residential) fixed connections per 100 *population*, which we calculate using U.S. Census Bureau population estimates for the United States and Puerto Rico – which are as of July 1 each year – and, for the remaining inhabited island areas, Census 2010 population for 2010 and later years and Census 2000 population for the earlier years. This statistic incorporates connections to business locations into a comparison to persons. (We note that the ratio of accurately-measured residential fixed connections to population has a maximum value for any given country and point in time – the value when every household is connected – if we assume that no household would have more than one fixed connection to its premises. For the United States in June, for example, the maximum value would be 40 because there were about 131 million households in the United States and inhabited insular areas and a population of about 332 million according to the sources used for Figure 5.)

⁸ Increases over time in the ratio of residential fixed connections to households indicate that increasing shares of households are connected at home. The ratio is somewhat different from the “take rate” of offered service (which may also be called an “adoption rate”) because some households may be located in areas where no fixed-location service is offered. These methodological differences are discussed in greater detail in *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*,

Census tract and county shares of households with reportable connections

- We estimate the share of households with fixed Internet access connections in individual census tracts and counties as of June 30, 2019.⁹ We continue to observe substantial variation among these estimates. *See* Figures 37 and 39.

Household subscribership rates and demographics

- The report includes charts that illustrate correlations between household subscribership rates and demographic measures. We update charts based on income, household density, education and age. The data indicate that some demographic variables are correlated with Internet access subscribership rates. *See* Figures 44-49.

and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Amended by the Broadband Data Improvement Act, GN Docket No.11-121, Eighth Broadband Progress Report, 27 FCC Rcd 10342, 10386, para. 94 (2012).

⁹ For both census tracts and counties, we continue to find estimates above 100% for the share of households with fixed Internet access connections. *See* p. 57 for more information.

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Figure 6
Connections over 200 kbps in at Least One Direction 2015-2019
(In thousands)

<i>Technology</i>	<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>		<i>2019</i>
	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>
Total	357,509	375,790	395,496	404,849	408,692	420,838	428,864	441,288	448,867
Total Fixed	100,075	102,111	103,980	105,593	106,130	108,065	109,087	110,756	112,663
Mobile Wireless	257,434	273,679	291,516	299,256	302,562	312,773	319,776	330,532	336,204

Figure 7
Residential Connections over 200 kbps in at Least One Direction 2015-2019
(In thousands)

<i>Technology</i>	<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>		<i>2019</i>
	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>
Total	306,292	322,557	330,987	337,978	341,094	351,966	358,867	368,512	373,131
Total Fixed	91,439	93,434	95,001	96,607	97,071	98,845	99,758	101,321	103,043
Mobile Wireless	214,853	229,122	235,985	241,371	244,022	253,121	259,109	267,191	270,087

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 8
Residential Fixed Connections by Downstream Speed 2016-2019

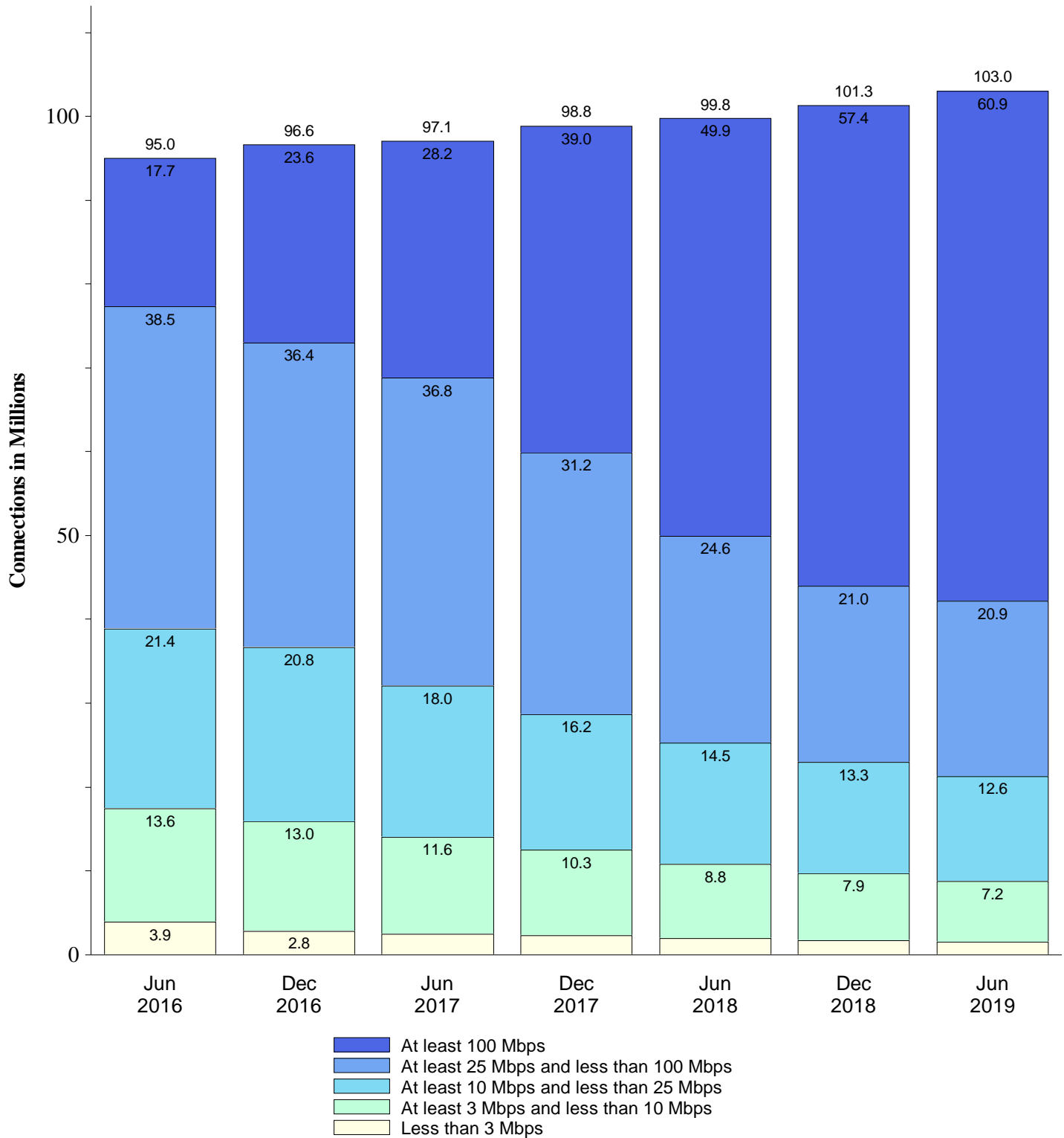
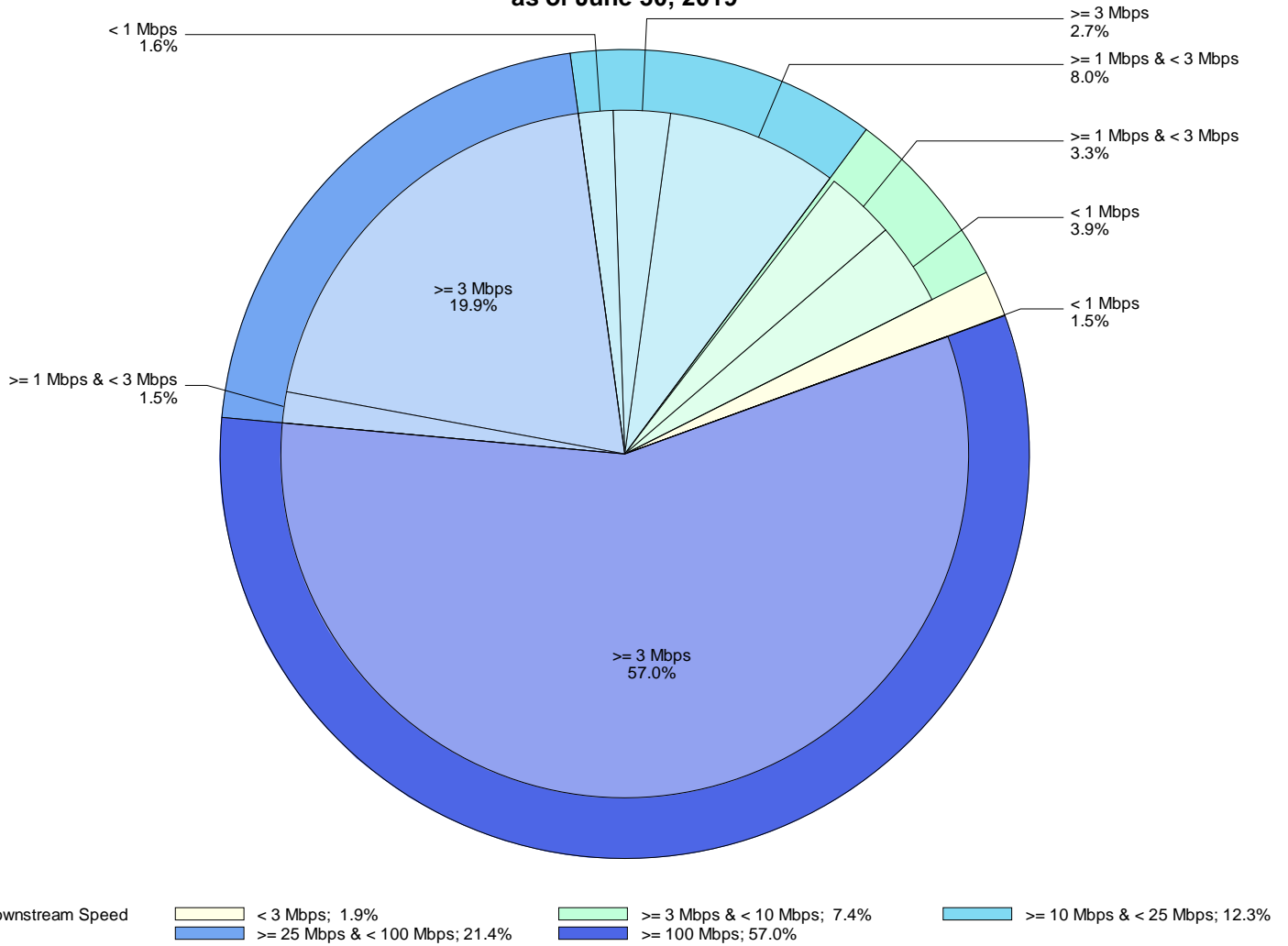


Figure 9
Distribution of Fixed Connections over 200 kbps in at Least One Direction
as of June 30, 2019



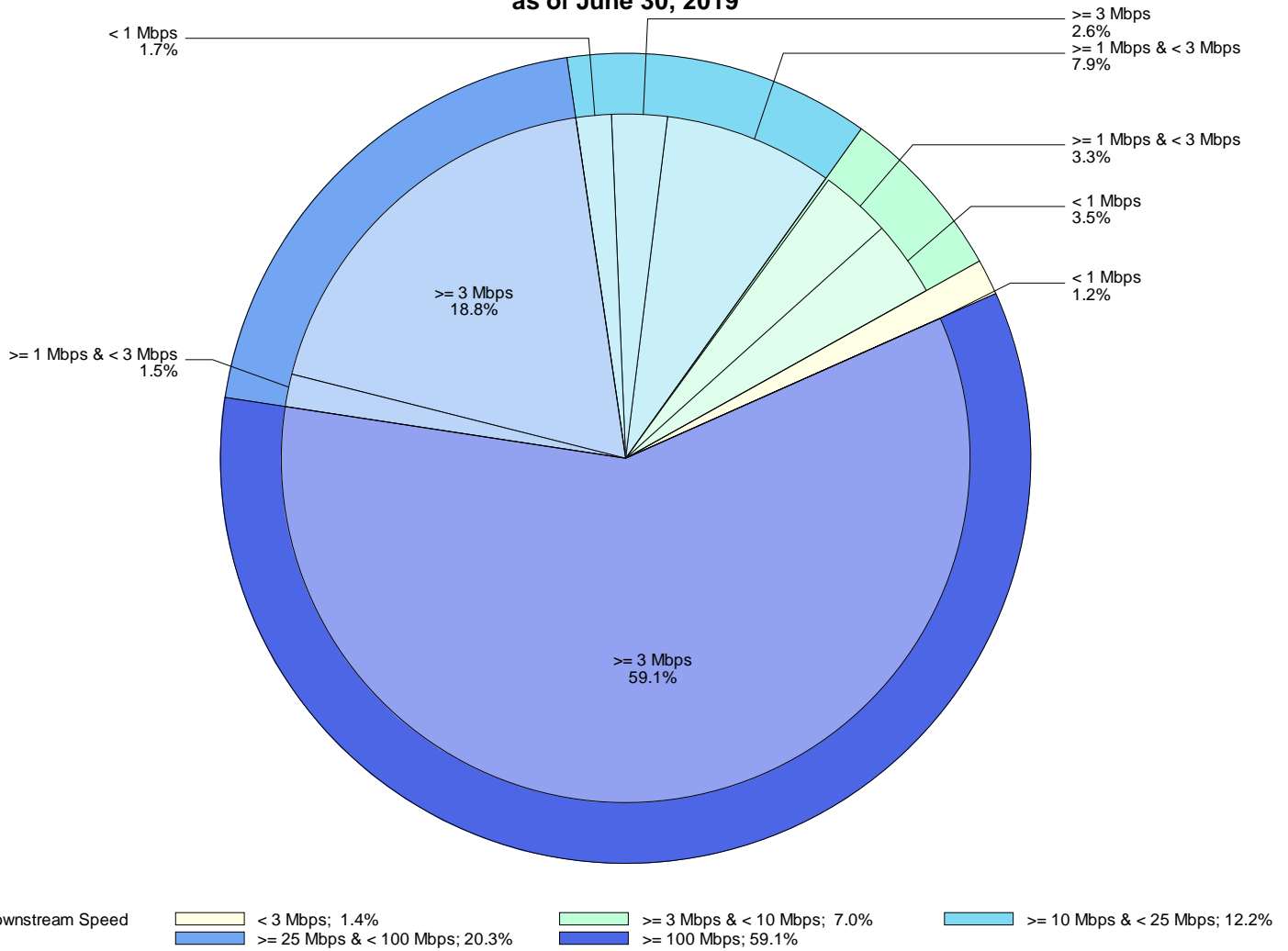
Fixed Connections over 200 kbps in at Least One Direction (in thousands)

Upstream Speed	Downstream Speed					Total
	Less than 3 Mbps	At least 3 Mbps and less than 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps	
Less than 1 Mbps	1,663	4,377	1,821	#	#	7,862
At least 1 Mbps & Less than 3 Mbps	426	3,702	9,065	1,641	8	14,842
At least 3 Mbps	3	270	3,013	22,466	64,208	89,960
Total	2,092	8,349	13,899	24,107	64,216	112,663

Percentages						
Less than 1 Mbps	1.5	3.9	1.6	0.0	0.0	7.0
At least 1 Mbps & Less than 3 Mbps	0.4	3.3	8.0	1.5	0.0	13.2
At least 3 Mbps	0.0	0.2	2.7	19.9	57.0	79.8
Total	1.9	7.4	12.3	21.4	57.0	100.0

Note: Figures may not sum to totals due to rounding. # = Rounds to zero.
Source: FCC Form 477.

Figure 10
Distribution of Residential Fixed Connections over 200 kbps in at Least One Direction
as of June 30, 2019



Residential Fixed Connections over 200 kbps in at Least One Direction (in thousands)

Upstream Speed	Downstream Speed					Total
	Less than 3 Mbps	At least 3 Mbps and less than 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps	
Less than 1 Mbps	1,243	3,658	1,708	#	#	6,610
At least 1 Mbps & Less than 3 Mbps	229	3,427	8,177	1,579	8	13,419
At least 3 Mbps	2	152	2,681	19,321	60,858	83,015
Total	1,474	7,237	12,566	20,900	60,866	103,043
Percentages						
Less than 1 Mbps	1.2	3.5	1.7	0.0	0.0	6.4
At least 1 Mbps & Less than 3 Mbps	0.2	3.3	7.9	1.5	0.0	13.0
At least 3 Mbps	0.0	0.1	2.6	18.8	59.1	80.6
Total	1.4	7.0	12.2	20.3	59.1	100.0

Note: Figures may not sum to totals due to rounding. # = Rounds to zero.
Source: FCC Form 477.

Figure 11
Connections over 200 kbps in at Least One Direction by Technology 2015-2019
(In thousands)

<i>Technology</i>	<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>		<i>2019</i>
	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>
Total	357,509	375,790	395,496	404,849	408,692	420,838	428,864	441,288	448,867
Total Fixed	100,075	102,111	103,980	105,593	106,130	108,065	109,087	110,756	112,663
aDSL	29,351	28,134	27,488	26,527	25,505	24,193	23,074	21,934	20,419
sDSL	77	60	55	42	44	28	28	20	17
Other Wireline ¹	642	637	622	599	619	581	558	555	515
Cable Modem	57,244	59,706	61,456	63,325	64,060	66,196	67,165	68,871	70,772
FTTP ²	9,646	10,450	11,087	11,986	12,831	13,890	14,889	15,928	17,408
Satellite	2,058	2,071	2,079	1,864	1,826	1,872	1,939	1,971	1,984
Fixed Wireless	1,056	1,054	1,193	1,250	1,245	1,306	1,434	1,477	1,549
Mobile Wireless	257,434	273,679	291,516	299,256	302,562	312,773	319,776	330,532	336,204

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 12
Connections by Technology as of June 30, 2019

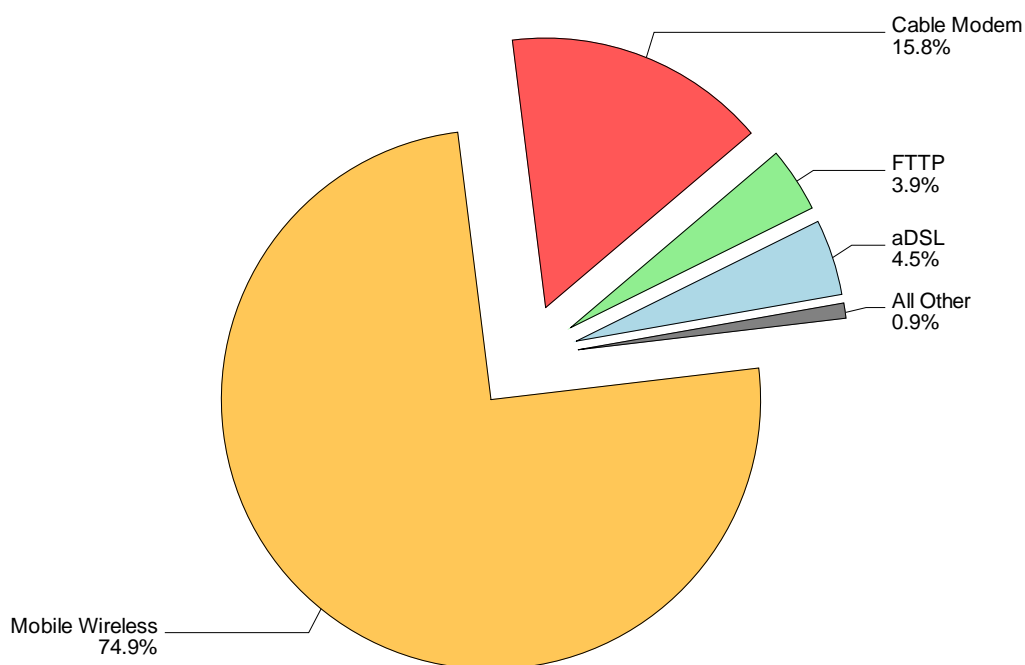


Figure 13
Residential Connections over 200 kbps in at Least One Direction by Technology 2015-2019
(In thousands)

<i>Technology</i>	<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>		<i>2019</i>
	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>
Total	306,292	322,557	330,987	337,978	341,094	351,966	358,867	368,512	373,131
Total Fixed	91,439	93,434	95,001	96,607	97,071	98,845	99,758	101,321	103,043
aDSL	26,157	25,139	24,486	23,691	22,774	21,653	20,671	19,692	18,280
sDSL	18	16	10	8	12	9	9	4	4
Other Wireline ¹	59	54	51	32	74	67	74	74	61
Cable Modem	53,544	55,799	57,358	59,145	59,687	61,567	62,320	63,802	65,476
FTTP ²	8,842	9,592	10,140	10,956	11,776	12,702	13,663	14,632	16,025
Satellite	1,875	1,891	1,897	1,676	1,637	1,688	1,751	1,787	1,805
Fixed Wireless	944	943	1,059	1,100	1,112	1,158	1,270	1,330	1,393
Mobile Wireless	214,853	229,122	235,985	241,371	244,022	253,121	259,109	267,191	270,087

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 14
Residential Connections by Technology as of June 30, 2019

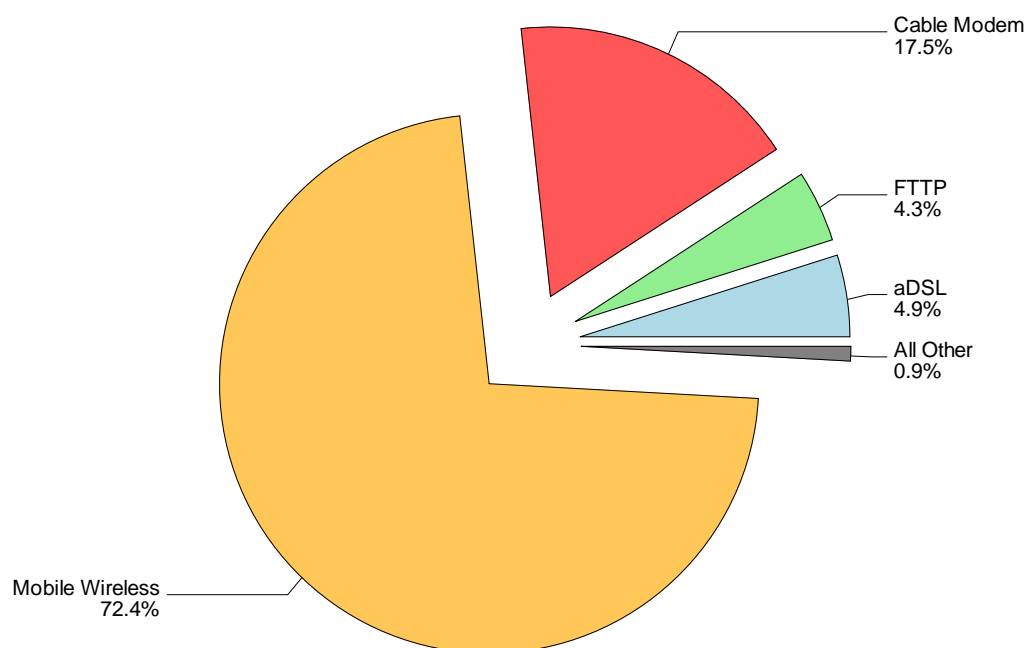


Figure 15
Fixed Connections at Least 3 Mbps Downstream and 768 kbps Upstream by Technology 2015-2019
(In thousands)

<i>Technology</i>	<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>		<i>2019</i>
	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>
Total	88,952	92,291	95,446	98,677	100,009	101,943	103,970	106,101	108,455
aDSL	20,947	20,744	21,147	21,042	20,621	19,257	18,876	18,124	17,000
sDSL	24	20	20	20	24	16	17	11	9
Other Wireline ¹	279	314	321	311	340	352	360	370	347
Cable Modem	55,819	58,423	60,343	62,855	63,719	65,906	66,961	68,695	70,608
FTTP ²	9,511	10,335	10,975	11,887	12,738	13,783	14,798	15,836	17,320
Satellite	1,690	1,744	1,775	1,609	1,586	1,563	1,722	1,770	1,801
Fixed Wireless	682	712	865	954	981	1,065	1,237	1,296	1,370

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 16
Residential Fixed Connections at Least 3 Mbps Downstream and 768 kbps Upstream by Technology 2015-2019
(In thousands)

<i>Technology</i>	<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>		<i>2019</i>
	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>
Total	82,320	85,439	88,198	91,258	92,355	93,987	95,756	97,675	99,780
aDSL	18,988	18,866	19,207	19,133	18,719	17,480	17,128	16,462	15,392
sDSL	1	2	2	2	7	6	6	2	2
Other Wireline ¹	45	47	49	31	73	66	72	71	60
Cable Modem	52,254	54,650	56,353	58,784	59,411	61,335	62,167	63,670	65,364
FTTP ²	8,750	9,512	10,063	10,883	11,704	12,616	13,590	14,560	15,955
Satellite	1,682	1,734	1,764	1,596	1,571	1,545	1,700	1,745	1,775
Fixed Wireless	600	628	759	830	870	939	1,092	1,164	1,232

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 17
Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream by Technology 2015-2019
(In thousands)

Technology	2015		2016		2017		2018		2019
	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun
Total	72,667	76,886	80,397	84,038	86,886	90,609	94,071	97,277	100,401
aDSL	9,471	9,799	10,349	10,810	11,321	11,598	11,822	11,864	11,342
sDSL	9	8	8	10	14	9	11	6	5
Other Wireline ¹	176	197	203	209	246	262	271	290	274
Cable Modem	52,658	55,710	57,951	60,349	61,704	63,978	65,808	67,705	69,719
FTTP ²	8,834	9,528	10,088	10,935	11,811	12,869	13,898	14,983	16,482
Satellite	1,298	1,393	1,467	1,342	1,373	1,402	1,595	1,677	1,726
Fixed Wireless	221	252	330	383	418	491	666	752	854

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 18
Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream
by Technology as of June 30, 2019

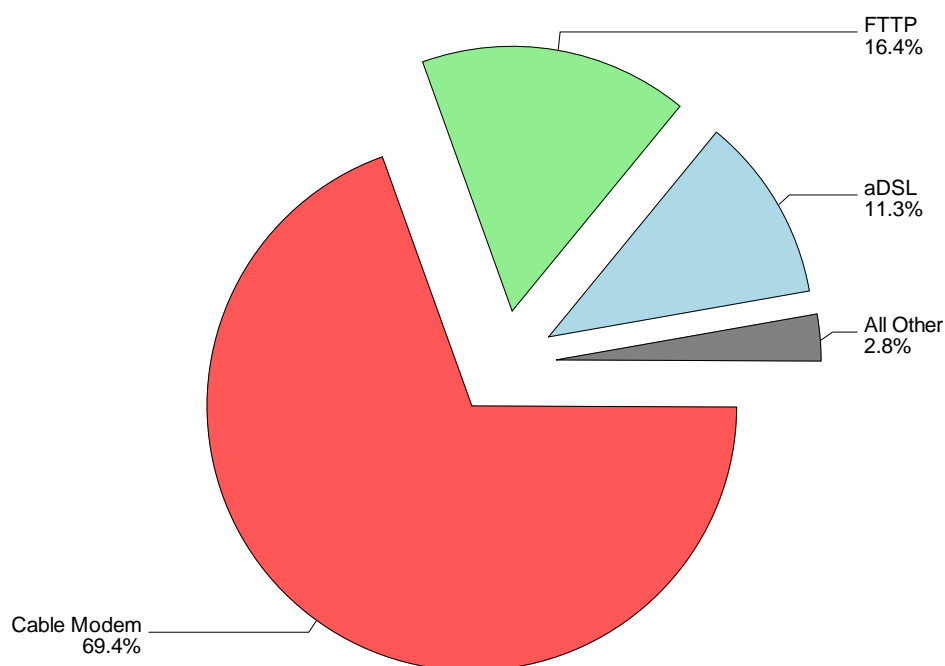


Figure 19
Residential Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream
by Technology 2015-2019
(In thousands)

<i>Technology</i>	<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>		<i>2019</i>
	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>
Total	67,898	71,784	74,841	78,201	80,671	84,163	86,973	89,849	92,623
aDSL	8,743	9,069	9,526	9,963	10,415	10,657	10,862	10,904	10,369
sDSL	#	1	2	2	6	5	6	2	1
Other Wireline ¹	38	43	47	30	71	64	65	66	57
Cable Modem	49,487	52,294	54,274	56,538	57,617	59,864	61,142	62,799	64,569
FTTP ²	8,144	8,776	9,248	10,004	10,835	11,762	12,741	13,754	15,164
Satellite	1,293	1,386	1,460	1,333	1,362	1,387	1,575	1,655	1,702
Fixed Wireless	191	213	283	332	365	425	582	670	762

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 20
Residential Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream
by Technology as of June 30, 2019

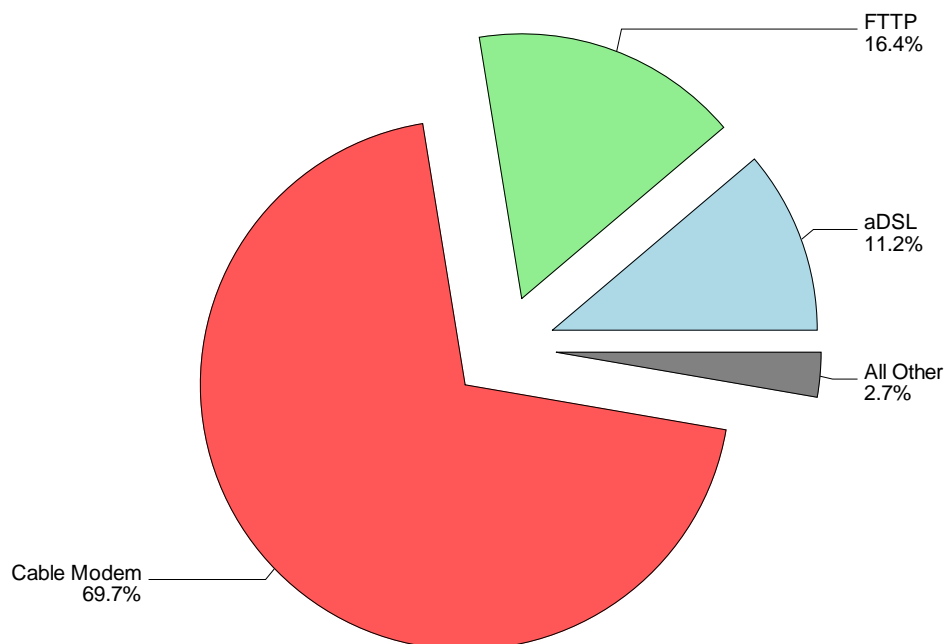


Figure 21
Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology 2015-2019
(In thousands)

Technology	2015		2016		2017		2018		2019
	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun
Total	48,767	54,338	58,765	62,933	68,280	73,875	78,952	82,944	86,674
aDSL	762	938	1,239	1,476	2,530	3,586	4,298	4,838	4,770
sDSL	*	*	*	*	*	*	*	*	*
Other Wireline ¹	122	138	155	166	203	219	203	226	230
Cable Modem	40,979	45,530	48,696	51,740	54,829	57,870	60,859	62,869	64,945
FTTP ²	6,856	7,673	8,587	9,422	10,344	11,489	12,568	13,750	15,280
Satellite	*	*	*	*	*	*	*	*	*
Fixed Wireless	47	55	72	92	120	143	224	263	321

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

* = Data withheld to maintain firm confidentiality.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 22
Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream
by Technology as of June 30, 2019

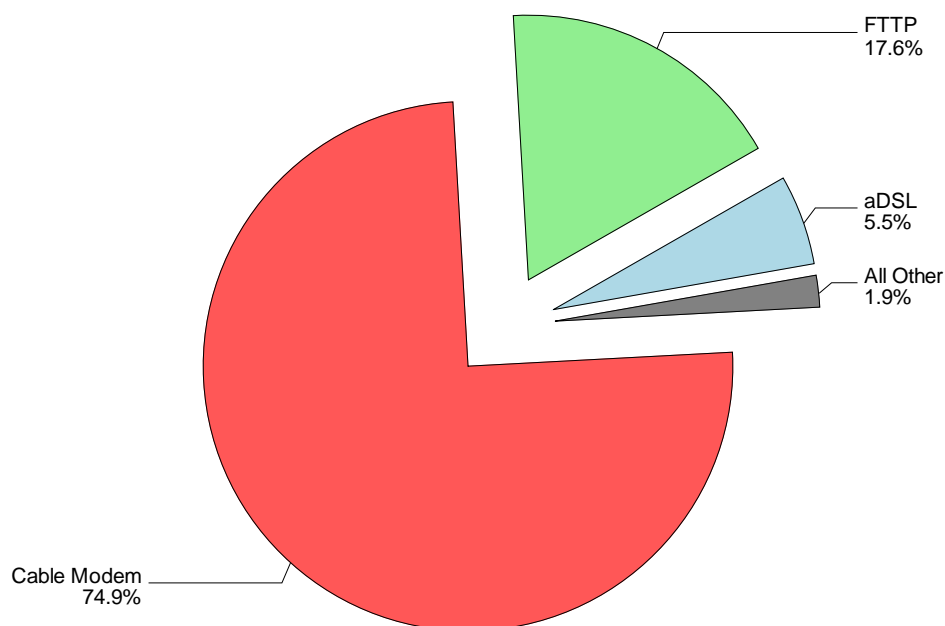


Figure 23**Residential Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology 2015-2019**
(In thousands)

<i>Technology</i>	<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>		<i>2019</i>
	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>
Total	46,532	51,812	55,729	59,518	64,520	69,447	73,288	76,852	80,179
aDSL	727	897	1,173	1,408	2,418	3,410	4,068	4,564	4,489
sDSL	*	*	*	*	*	*	*	*	*
Other Wireline ¹	26	31	41	27	67	59	54	59	53
Cable Modem	39,416	43,746	46,527	49,300	52,154	54,748	56,620	58,331	60,132
FTTP ²	6,323	7,089	7,916	8,674	9,532	10,553	11,570	12,689	14,122
Satellite	*	*	*	*	*	*	*	*	*
Fixed Wireless	40	46	57	75	101	119	193	231	280

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

* = Data withheld to maintain firm confidentiality.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

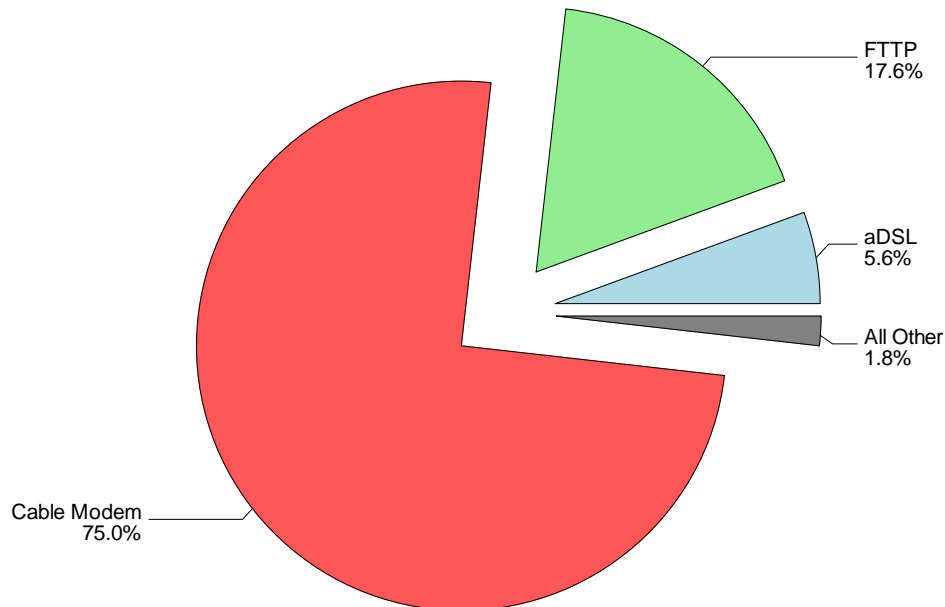
Figure 24**Residential Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology as of June 30, 2019**

Figure 25
Residential Fixed Connections over 200 kbps in at Least One Direction 2015-2019
 (Shares of selected technologies)



Some previously-published data may have been revised. Figures may not sum to totals due to rounding.

Figure 26
Residential Fixed Connections over 200 kbps in at Least One Direction 2015-2019
 (Net adds for selected technologies)

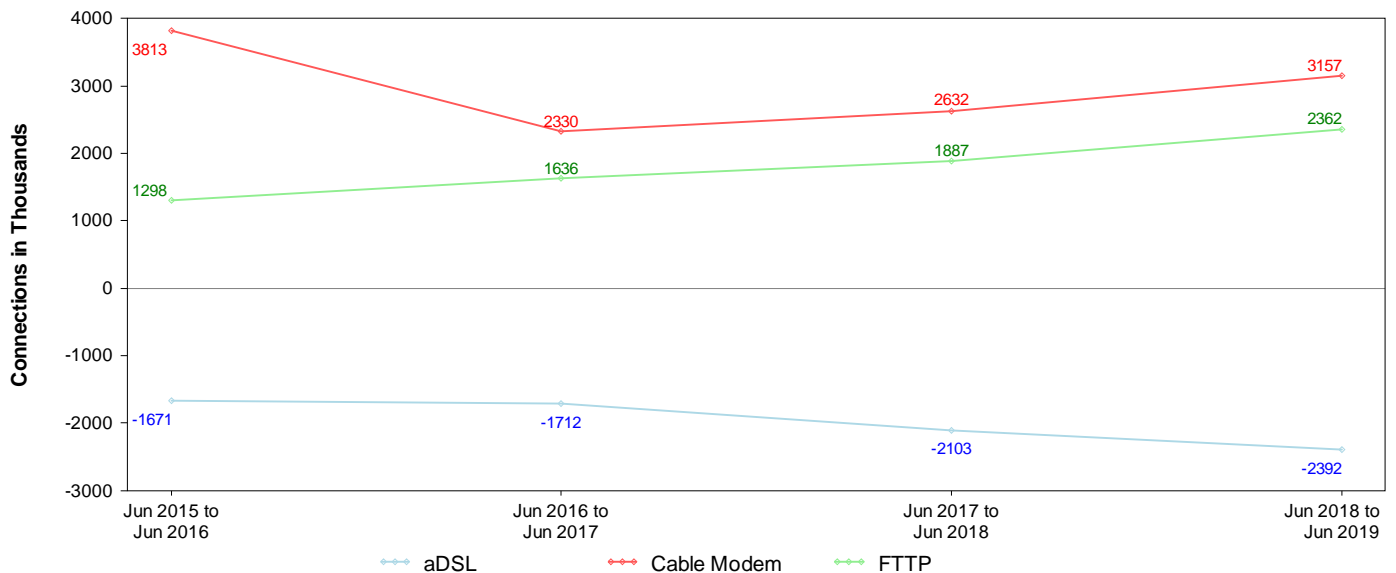


Figure 27
Residential Fixed Connections by Technology as of June 30, 2019
(Shares of selected technologies for selected speeds, connections in thousands)

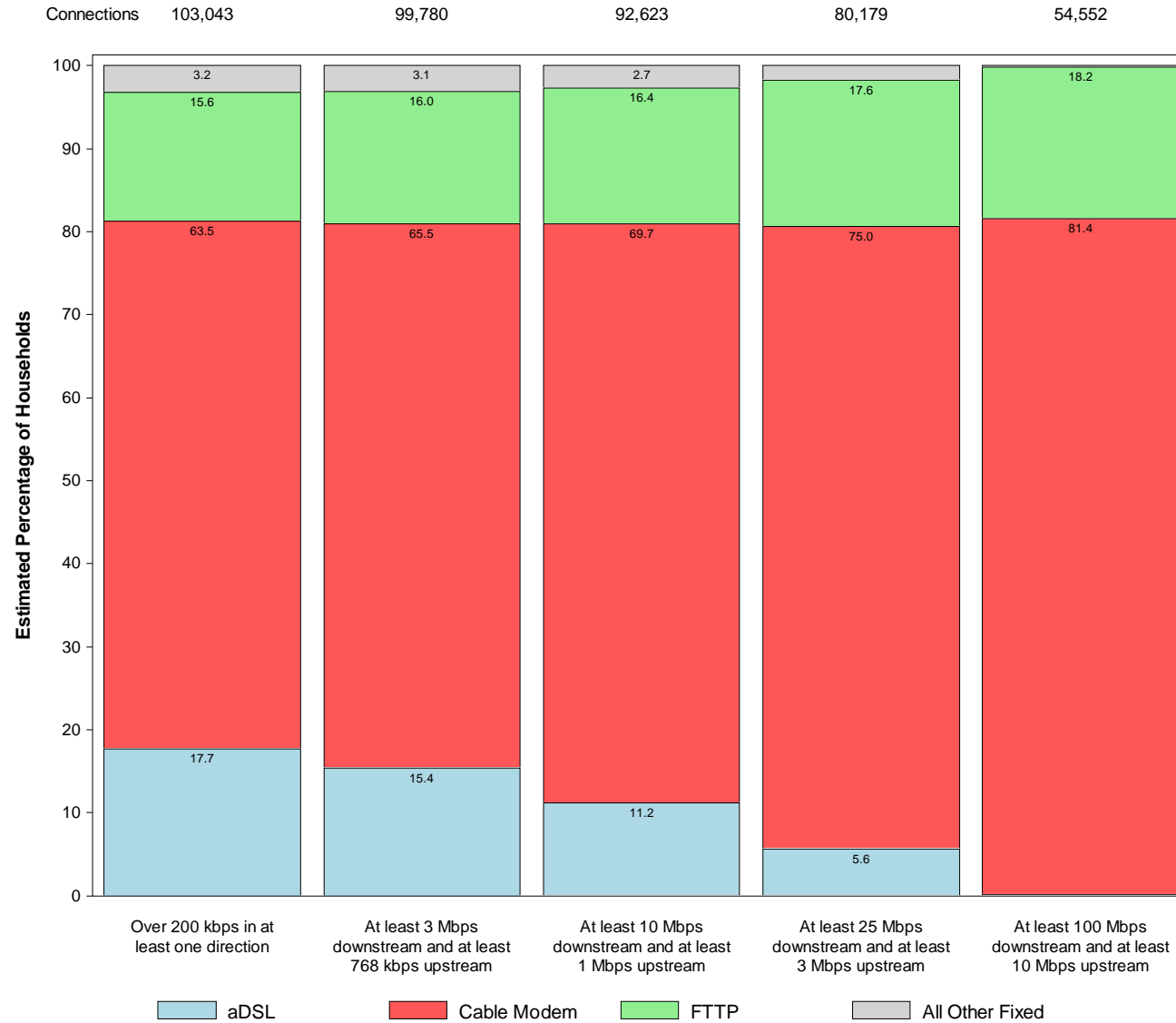


Figure 28
Fixed Connections by Downstream Speed Tier and Technology as of June 30, 2019
(In thousands)

Technology	Downstream Speed						Total
	Less than 1.5 Mbps	At least 1.5 Mbps and less than 3 Mbps	At least 3 Mbps and less than 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps	
aDSL	473	978	6,136	7,396	5,279	157	20,419
sDSL	4	4	5	2	*	*	17
Other Wireline ¹	25	142	74	43	29	202	515
Cable Modem	28	48	951	3,879	12,689	53,176	70,772
FTTP	35	35	557	1,449	4,741	10,591	17,408
Satellite	163	17	78	602	*	*	1,984
Fixed Wireless	57	83	549	527	249	83	1,549
Total	785	1,306	8,349	13,899	24,107	64,216	112,663

Percentages							
aDSL	0.4	0.9	5.4	6.6	4.7	0.1	18.1
sDSL	0.0	0.0	0.0	0.0	*	*	0.0
Other Wireline ¹	0.0	0.1	0.1	0.0	0.0	0.2	0.5
Cable Modem	0.0	0.0	0.8	3.4	11.3	47.2	62.8
FTTP	0.0	0.0	0.5	1.3	4.2	9.4	15.5
Satellite	0.1	0.0	0.1	0.5	*	*	1.8
Fixed Wireless	0.1	0.1	0.5	0.5	0.2	0.1	1.4
Total	0.7	1.2	7.4	12.3	21.4	57.0	100.0

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Note: Figures may not sum to totals due to rounding.

Source: FCC Form 477.

Figure 29
Residential Fixed Connections by Downstream Speed Tier and Technology as of June 30, 2019
(In thousands)

Technology	Downstream Speed						Total
	Less than 1.5 Mbps	At least 1.5 Mbps and less than 3 Mbps	At least 3 Mbps and less than 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps	
aDSL	420	791	5,314	6,639	4,970	145	18,280
sDSL	2	1	#	#	*	*	4
Other Wireline ¹	#	1	3	5	9	43	61
Cable Modem	22	30	832	3,556	10,378	50,658	65,476
FTTP	28	27	512	1,290	4,223	9,945	16,025
Satellite	25	4	74	599	*	*	1,805
Fixed Wireless	49	75	502	476	222	68	1,393
Total	545	930	7,237	12,566	20,900	60,866	103,043

Percentages							
aDSL	0.4	0.8	5.2	6.4	4.8	0.1	17.7
sDSL	0.0	0.0	0.0	0.0	*	*	0.0
Other Wireline ¹	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Cable Modem	0.0	0.0	0.8	3.5	10.1	49.2	63.5
FTTP	0.0	0.0	0.5	1.3	4.1	9.7	15.6
Satellite	0.0	0.0	0.1	0.6	*	*	1.8
Fixed Wireless	0.0	0.1	0.5	0.5	0.2	0.1	1.4
Total	0.5	0.9	7.0	12.2	20.3	59.1	100.0

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Note: Figures may not sum to totals due to rounding.

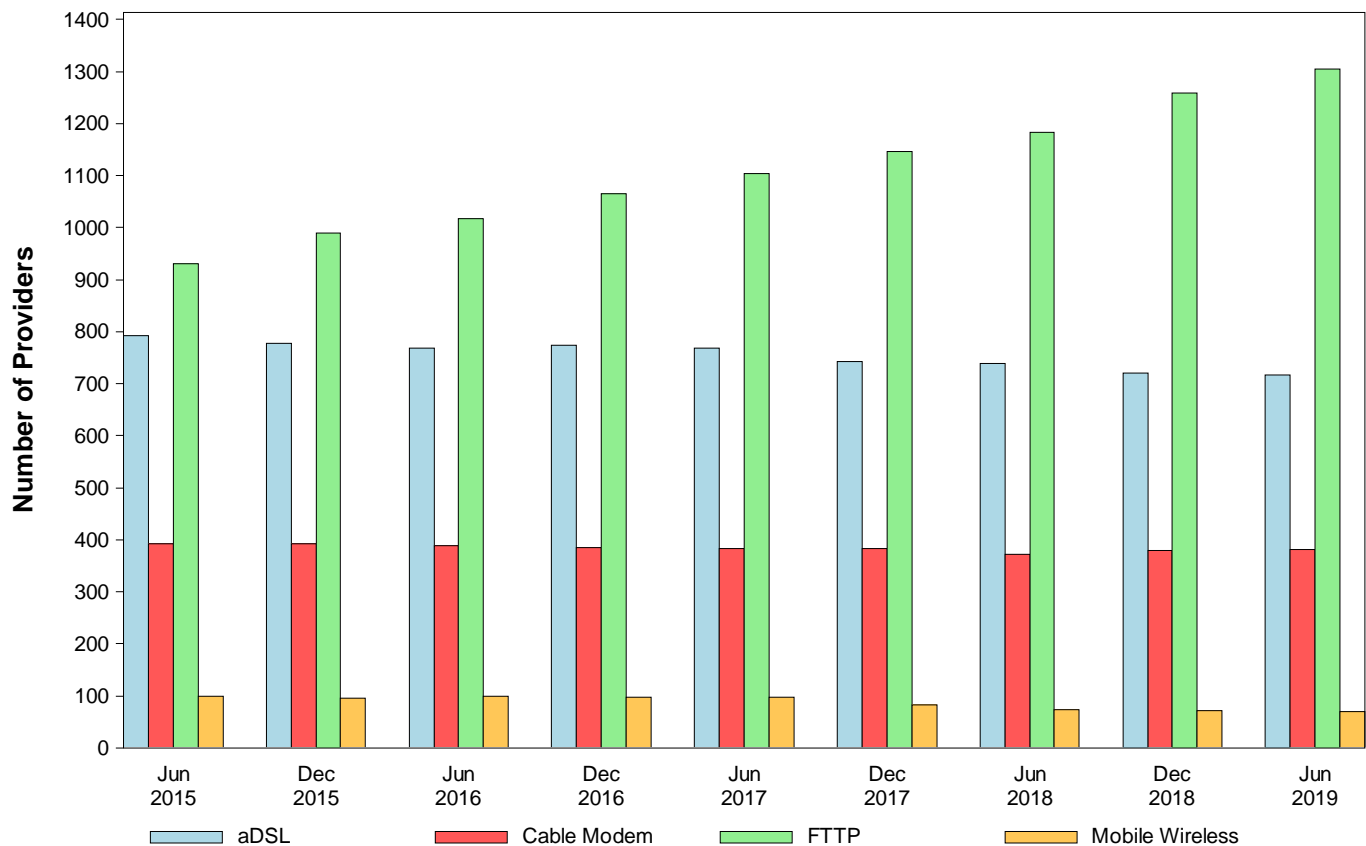
Source: FCC Form 477.

Figure 30
Nationwide Number of Providers of Connections over 200 kbps in at Least One Direction
by Technology 2015-2019

<i>Technology</i>	<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>		<i>2019</i>
	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>
aDSL	792	778	769	774	768	743	738	720	717
sDSL	177	179	171	160	161	150	136	125	122
Other Wireline ¹	240	250	244	236	243	235	249	241	223
Cable Modem	393	392	388	385	384	383	372	379	381
FTTP	931	990	1,017	1,066	1,103	1,147	1,183	1,259	1,304
Satellite	10	10	6	6	5	6	6	6	6
Fixed Wireless	949	983	1,027	1,071	1,095	1,160	1,188	1,229	1,237
Mobile Wireless	100	96	99	98	98	83	73	71	70
Total	1,881	1,917	1,957	2,000	2,030	2,090	2,129	2,198	2,207

¹ For this Figure, the categories Power Line and All Other were combined with Other Wireline.
Multiple Form 477 filers within a holding company structure count as one provider. * = 1-3 providers.
Some previously published data may have been revised.

Figure 31
Nationwide Number of Providers of Connections over 200 kbps in at Least One Direction
Selected Technologies 2015-2019



SECTION 3
SUMMARY STATISTICS: THE STATES

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Figure 32
Residential Fixed Connections and Households by State as of June 30, 2019
(Connections and households, in thousands)

State	Households	At least 200 kbps in at least One Direction		At least 10 Mbps Down and 1 Mbps Up		At least 25 Mbps Down and 3 Mbps Up		At least 100 Mbps Down and 10 Mbps Up	
		Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio
Alabama	1,868	1,406	0.75	1,194	0.64	967	0.52	701	0.38
Alaska	253	203	0.80	175	0.69	127	0.50	*	*
American Samoa	10	*	*	*	*	*	*	0	0.00
Arizona	2,571	2,196	0.85	1,882	0.73	1,651	0.64	1,100	0.43
Arkansas	1,158	773	0.67	616	0.53	439	0.38	241	0.21
California	13,044	11,548	0.89	10,666	0.82	9,345	0.72	6,038	0.46
Colorado	2,149	1,966	0.91	1,689	0.79	1,539	0.72	675	0.31
Connecticut	1,371	1,241	0.91	1,163	0.85	973	0.71	663	0.48
Delaware	363	351	0.97	340	0.93	327	0.90	181	0.50
District of Columbia	284	256	0.90	245	0.86	231	0.81	146	0.51
Florida	7,736	7,297	0.94	6,812	0.88	5,924	0.77	4,539	0.59
Georgia	3,759	3,173	0.84	2,850	0.76	2,320	0.62	1,711	0.46
Guam	42	*	*	*	*	*	*	*	*
Hawaii	459	464	1.01	443	0.96	*	*	*	*
Idaho	630	519	0.82	367	0.58	292	0.46	114	0.18
Illinois	4,846	3,925	0.81	3,562	0.74	2,852	0.59	2,073	0.43
Indiana	2,570	2,023	0.79	1,759	0.68	1,401	0.55	970	0.38
Iowa	1,265	974	0.77	764	0.60	633	0.50	312	0.25
Kansas	1,129	906	0.80	784	0.69	616	0.55	415	0.37
Kentucky	1,735	1,382	0.80	1,177	0.68	970	0.56	690	0.40
Louisiana	1,739	1,322	0.76	1,167	0.67	935	0.54	639	0.37
Maine	560	527	0.94	443	0.79	351	0.63	270	0.48
Maryland	2,205	1,984	0.90	1,909	0.87	1,782	0.81	1,040	0.47
Massachusetts	2,617	2,416	0.92	2,319	0.89	2,233	0.85	1,309	0.50
Michigan	3,935	3,155	0.80	2,837	0.72	2,359	0.60	1,771	0.45
Minnesota	2,186	1,812	0.83	1,519	0.70	1,328	0.61	710	0.32
Mississippi	1,104	725	0.66	586	0.53	392	0.36	198	0.18
Missouri	2,415	1,880	0.78	1,567	0.65	1,282	0.53	951	0.39
Montana	428	348	0.81	276	0.65	224	0.52	*	*
Nebraska	759	612	0.81	526	0.69	436	0.57	335	0.44

Figure 32 - Continued
Residential Fixed Connections and Households by State as of June 30, 2019
(Connections and households, in thousands)

State	Households	At least 200 kbps in at least One Direction		At least 10 Mbps Down and 1 Mbps Up		At least 25 Mbps Down and 3 Mbps Up		At least 100 Mbps Down and 10 Mbps Up	
		Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio
Nevada	1,099	963	0.88	890	0.81	767	0.70	610	0.56
New Hampshire	532	516	0.97	476	0.90	431	0.81	226	0.43
New Jersey	3,232	3,064	0.95	2,975	0.92	2,877	0.89	2,090	0.65
New Mexico	780	596	0.76	439	0.56	360	0.46	132	0.17
New York	7,343	6,419	0.87	6,137	0.84	5,791	0.79	4,994	0.68
North Carolina	3,965	3,448	0.87	2,983	0.75	2,691	0.68	2,179	0.55
North Dakota	318	274	0.86	257	0.81	238	0.75	183	0.57
Northern Mariana Isl	16	*	*	*	*	*	*	*	*
Ohio	4,676	3,788	0.81	3,351	0.72	2,748	0.59	1,974	0.42
Oklahoma	1,480	1,082	0.73	895	0.60	701	0.47	439	0.30
Oregon	1,612	1,381	0.86	1,196	0.74	1,073	0.67	520	0.32
Pennsylvania	5,053	4,208	0.83	3,809	0.75	3,436	0.68	1,939	0.38
Puerto Rico	1,193	466	0.39	321	0.27	178	0.15	*	*
Rhode Island	410	374	0.91	369	0.90	352	0.86	289	0.70
South Carolina	1,922	1,627	0.85	1,464	0.76	1,196	0.62	912	0.47
South Dakota	344	279	0.81	262	0.76	236	0.69	161	0.47
Tennessee	2,597	2,042	0.79	1,847	0.71	1,530	0.59	1,186	0.46
Texas	9,692	8,068	0.83	7,365	0.76	6,225	0.64	4,082	0.42
Utah	977	874	0.89	753	0.77	661	0.68	292	0.30
Vermont	260	244	0.94	197	0.76	156	0.60	75	0.29
Virgin Islands	43	26	0.61	16	0.36	9	0.20	*	*
Virginia	3,151	2,662	0.84	2,439	0.77	2,257	0.72	1,483	0.47
Washington	2,848	2,528	0.89	2,225	0.78	2,028	0.71	959	0.34
West Virginia	733	553	0.75	432	0.59	356	0.49	187	0.25
Wisconsin	2,358	1,945	0.82	1,693	0.72	1,381	0.59	1,075	0.46
Wyoming	230	191	0.83	157	0.68	137	0.60	95	0.41
Total	122,060	103,043	0.84	92,623	0.76	80,179	0.66	54,552	0.45

= Rounds to Zero; * = Data withheld to maintain firm confidentiality.

Note: Figures may not sum to totals due to rounding.

Sources: FCC Form 477 (Connections); 2015-2019 ACS 5-year estimates; Census 2010.

Figure 33
Connections by Type of End User by State as of June 30, 2019
(Connections over 200 kbps in at least one direction, in thousands)

State	Connections		Percentages		Total
	Residential	Business	Residential	Business	
Alabama	5,204	1,265	80.4	19.6	6,469
Alaska	826	130	86.4	13.6	955
American Samoa	*	*	*	*	*
Arizona	7,470	1,397	84.2	15.8	8,867
Arkansas	2,878	809	78.1	21.9	3,687
California	47,305	7,971	85.6	14.4	55,276
Colorado	6,382	1,311	83.0	17.0	7,693
Connecticut	4,135	942	81.4	18.6	5,077
Delaware	1,102	220	83.4	16.6	1,321
District of Columbia	1,006	552	64.6	35.4	1,559
Florida	24,977	4,689	84.2	15.8	29,666
Georgia	11,574	2,680	81.2	18.8	14,254
Guam	189	53	78.1	21.9	242
Hawaii	1,762	295	85.7	14.3	2,057
Idaho	1,805	376	82.8	17.2	2,181
Illinois	14,383	3,062	82.4	17.6	17,445
Indiana	6,944	1,525	82.0	18.0	8,469
Iowa	3,274	764	81.1	18.9	4,038
Kansas	4,976	724	87.3	12.7	5,700
Kentucky	4,881	893	84.5	15.5	5,774
Louisiana	5,236	963	84.5	15.5	6,199
Maine	1,439	419	77.5	22.5	1,858
Maryland	7,259	1,305	84.8	15.2	8,563
Massachusetts	8,455	1,679	83.4	16.6	10,134
Michigan	10,948	2,479	81.5	18.5	13,427
Minnesota	6,181	1,399	81.5	18.5	7,580
Mississippi	3,009	581	83.8	16.2	3,590
Missouri	6,505	1,429	82.0	18.0	7,934
Montana	1,076	300	78.2	21.8	1,376
Nebraska	1,945	553	77.9	22.1	2,498
Nevada	3,439	606	85.0	15.0	4,045
New Hampshire	1,504	375	80.0	20.0	1,879
New Jersey	10,760	2,125	83.5	16.5	12,885
New Mexico	2,145	401	84.3	15.7	2,545
New York	24,817	4,582	84.4	15.6	29,399
North Carolina	10,900	2,535	81.1	18.9	13,435
North Dakota	833	223	78.9	21.1	1,057
Northern Mariana Isl	*	*	*	*	*
Ohio	12,946	2,948	81.5	18.5	15,894
Oklahoma	4,075	827	83.1	16.9	4,903
Oregon	4,637	1,006	82.2	17.8	5,643
Pennsylvania	14,360	3,105	82.2	17.8	17,465
Puerto Rico	3,601	410	89.8	10.2	4,011
Rhode Island	1,155	237	83.0	17.0	1,392
South Carolina	5,243	1,200	81.4	18.6	6,443
South Dakota	873	242	78.3	21.7	1,115
Tennessee	7,072	1,735	80.3	19.7	8,808
Texas	31,803	5,731	84.7	15.3	37,535
Utah	3,133	683	82.1	17.9	3,816
Vermont	684	210	76.5	23.5	894
Virgin Islands	124	15	89.1	10.9	139
Virginia	8,795	2,198	80.0	20.0	10,994
Washington	8,611	1,696	83.5	16.5	10,307
West Virginia	1,638	323	83.5	16.5	1,961
Wisconsin	6,108	1,380	81.6	18.4	7,488
Wyoming	642	160	80.1	19.9	802
Total	373,131	75,736	83.1	16.9	448,867

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Figures may not sum to totals due to rounding.

Source: FCC Form 477.

Figure 34
Connections by Technology by State as of June 30, 2019
(Connections over 200 kbps in at least one direction, in thousands)

<i>State</i>	<i>ADSL</i>	<i>SDSL</i>	<i>Other Wireline¹</i>	<i>Cable Modem</i>	<i>Fiber</i>	<i>Satellite</i>	<i>Fixed Wireless</i>	<i>Mobile Wireless</i>	<i>Total</i>
Alabama	427	#	*	831	202	*	7	4,935	6,469
Alaska	77	*	2	*	8	*	11	716	955
American Samoa	0	0	0	*	*	0	*	*	*
Arizona	514	*	11	1,559	198	*	45	6,503	8,867
Arkansas	290	#	*	415	80	*	9	2,838	3,687
California	2,523	3	*	8,385	1,401	*	151	42,608	55,276
Colorado	*	#	17	1,394	209	*	75	5,554	7,693
Connecticut	*	*	2	1,052	26	*	#	3,716	5,077
Delaware	*	*	3	244	*	*	*	941	1,321
District of Columbia	*	*	6	*	*	*	*	1,266	1,559
Florida	1,300	#	*	5,419	1,114	*	19	21,695	29,666
Georgia	827	#	*	1,969	587	*	7	10,781	14,254
Guam	*	0	0	*	*	0	0	200	242
Hawaii	*	*	1	*	64	*	2	1,558	2,057
Idaho	165	*	3	238	90	*	53	1,615	2,181
Illinois	998	#	*	2,865	276	*	87	13,157	17,445
Indiana	542	#	*	1,228	322	*	44	6,278	8,469
Iowa	259	#	*	494	228	*	48	2,976	4,038
Kansas	213	#	*	490	221	*	43	4,712	5,700
Kentucky	366	*	2	850	219	*	20	4,278	5,774
Louisiana	368	*	3	841	168	*	9	4,749	6,199
Maine	114	1	*	431	10	*	7	1,281	1,858
Maryland	*	#	16	1,180	*	*	5	6,412	8,563
Massachusetts	*	*	19	1,974	*	*	11	7,490	10,134
Michigan	720	1	*	2,404	150	*	47	10,009	13,427
Minnesota	447	2	*	1,200	254	*	33	5,610	7,580
Mississippi	323	#	*	343	63	*	7	2,788	3,590
Missouri	582	1	*	999	334	*	48	5,890	7,934
Montana	96	*	2	*	35	*	24	986	1,376
Nebraska	135	#	*	388	105	*	32	1,826	2,498

Figure 34 - Continued
Connections by Technology by State as of June 30, 2019
(Connections over 200 kbps in at least one direction, in thousands)

<i>State</i>	<i>ADSL</i>	<i>SDSL</i>	<i>Other Wireline¹</i>	<i>Cable Modem</i>	<i>Fiber</i>	<i>Satellite</i>	<i>Fixed Wireless</i>	<i>Mobile Wireless</i>	<i>Total</i>
Nevada	187	#	5	*	64	*	26	2,996	4,045
New Hampshire	66	#	*	461	31	*	2	1,309	1,879
New Jersey	118	*	25	2,183	*	*	#	9,511	12,885
New Mexico	215	*	4	334	57	*	24	1,894	2,545
New York	308	*	37	4,991	1,679	*	11	22,318	29,399
North Carolina	713	#	*	2,464	468	*	11	9,697	13,435
North Dakota	33	#	*	172	95	*	4	749	1,057
Northern Mariana Isl	*	0	*	*	*	0	0	*	*
Ohio	897	*	11	2,729	347	*	50	11,809	15,894
Oklahoma	340	#	*	601	140	*	53	3,713	4,903
Oregon	220	#	*	1,013	206	*	32	4,131	5,643
Pennsylvania	489	#	25	3,035	*	*	7	12,853	17,465
Puerto Rico	*	0	3	*	11	*	21	3,387	4,011
Rhode Island	*	*	2	*	*	*	*	985	1,392
South Carolina	390	#	*	1,092	233	*	5	4,681	6,443
South Dakota	38	*	#	185	67	*	10	808	1,115
Tennessee	448	#	*	1,251	442	*	15	6,582	8,808
Texas	1,791	#	*	4,759	1,786	*	236	28,722	37,535
Utah	148	*	6	546	188	*	53	2,868	3,816
Vermont	82	*	2	155	27	*	4	620	894
Virgin Islands	*	0	*	*	*	*	8	*	139
Virginia	255	#	*	1,564	961	*	20	8,084	10,994
Washington	392	#	*	1,961	251	*	40	7,584	10,307
West Virginia	*	*	1	391	13	*	4	1,353	1,961
Wisconsin	545	*	3	*	172	*	36	5,380	7,488
Wyoming	46	*	1	118	13	*	28	587	802
Total	20,419	17	515	70,772	17,408	1,984	1,549	336,204	448,867

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Figures may not sum to totals due to rounding.

Source: FCC Form 477.

Figure 35
Percentage of Fixed Connections by Downstream Speed by State as of June 30, 2019

State	% over 200 kbps Downstream	% at least 3 Mbps Downstream	Over 200 kbps Upstream and		
			% at least 10 Mbps Downstream	% at least 25 Mbps Downstream	% at least 100 Mbps Downstream
Alabama	99.7	96.6	86.3	70.5	49.7
Alaska	98.9	94.9	84.1	60.9	43.6
American Samoa	*	*	*	*	*
Arizona	99.8	98.2	92.5	75.4	52.5
Arkansas	99.7	96.1	82.7	59.1	33.4
California	99.8	98.5	91.3	79.6	58.1
Colorado	99.8	97.7	92.8	78.4	51.5
Connecticut	99.7	99.4	92.8	77.9	63.8
Delaware	99.9	99.2	95.9	92.1	67.6
District of Columbia	99.9	98.6	93.5	87.9	70.2
Florida	99.8	98.8	94.5	84.3	60.2
Georgia	99.5	97.6	89.8	76.2	52.0
Guam	*	*	*	*	*
Hawaii	99.9	99.8	93.8	88.5	65.0
Idaho	99.7	97.0	82.5	57.4	39.3
Illinois	99.8	98.5	90.3	76.3	51.0
Indiana	99.6	98.1	87.7	72.5	46.6
Iowa	99.7	96.3	84.8	66.8	32.2
Kansas	99.8	97.8	87.4	66.8	44.7
Kentucky	99.5	96.8	85.6	71.6	49.9
Louisiana	99.6	96.9	88.5	71.5	48.1
Maine	99.1	96.8	82.5	66.5	53.6
Maryland	99.9	99.0	95.1	89.2	66.1
Massachusetts	99.9	99.1	95.1	91.6	71.6
Michigan	99.5	98.2	89.7	77.5	54.3
Minnesota	99.8	97.7	89.5	73.7	48.7
Mississippi	99.5	95.3	81.2	58.1	32.3
Missouri	99.7	97.0	86.2	69.2	51.3
Montana	99.8	96.2	85.1	65.3	51.5
Nebraska	99.6	97.7	88.5	71.7	53.5

Figure 35 - Continued
Percentage of Fixed Connections by Downstream Speed by State as of June 30, 2019

State	% over 200 kbps Downstream	% at least 3 Mbps Downstream	Over 200 kbps Upstream and		
			% at least 10 Mbps Downstream	% at least 25 Mbps Downstream	% at least 100 Mbps Downstream
Nevada	99.9	98.9	94.4	81.6	61.0
New Hampshire	99.4	97.6	90.5	82.7	66.4
New Jersey	99.8	99.1	96.5	93.3	76.9
New Mexico	99.9	96.3	85.1	62.4	34.9
New York	99.7	99.1	94.7	89.1	76.2
North Carolina	99.4	97.8	88.9	78.1	62.4
North Dakota	99.9	98.6	94.4	85.9	64.6
Northern Mariana Isl	*	*	*	*	*
Ohio	99.8	98.1	88.8	72.7	52.6
Oklahoma	99.7	97.8	83.0	63.8	41.4
Oregon	99.7	97.7	90.8	78.1	53.1
Pennsylvania	99.8	97.8	90.9	83.3	59.2
Puerto Rico	100.0	93.4	73.1	43.4	22.4
Rhode Island	99.6	99.2	98.0	92.9	74.2
South Carolina	99.7	98.2	90.3	75.2	56.6
South Dakota	99.8	98.6	95.2	84.3	54.7
Tennessee	99.6	97.9	90.5	77.2	56.2
Texas	99.9	98.6	91.2	76.8	55.0
Utah	99.9	98.6	91.9	76.5	47.7
Vermont	98.0	94.6	79.2	65.2	45.4
Virgin Islands	99.9	99.8	65.3	*	*
Virginia	99.5	98.0	91.6	83.9	62.4
Washington	99.6	97.9	91.8	80.2	57.5
West Virginia	98.2	97.3	77.4	64.0	44.5
Wisconsin	99.3	97.3	88.2	71.3	54.8
Wyoming	99.9	96.4	86.3	73.6	48.0
Total	99.7	98.1	90.7	78.4	57.0

Figure 36
Providers of Connections by Technology by State as of June 30, 2019
(Connections over 200 kbps in at least one direction, in thousands)

<i>State</i>	<i>ADSL</i>	<i>SDSL</i>	<i>Other Wireline¹</i>	<i>Cable Modem</i>	<i>Fiber</i>	<i>Satellite</i>	<i>Fixed Wireless</i>	<i>Mobile Wireless</i>	<i>Total</i>
Alabama	23	4	*	17	38	*	21	7	74
Alaska	15	*	11	*	16	*	15	9	37
American Samoa	0	0	0	*	*	0	*	*	*
Arizona	23	*	22	16	43	*	51	6	106
Arkansas	23	5	*	19	42	*	23	5	83
California	38	12	*	33	87	*	127	5	213
Colorado	*	6	23	17	69	*	62	9	135
Connecticut	*	*	12	9	21	*	5	4	35
Delaware	*	*	10	5	*	*	*	4	23
District of Columbia	*	*	13	*	*	*	*	4	41
Florida	23	5	*	21	71	*	32	6	108
Georgia	26	4	*	28	84	*	25	5	120
Guam	*	0	0	*	*	0	0	4	4
Hawaii	*	*	8	*	11	*	5	5	21
Idaho	21	*	13	19	40	*	42	9	75
Illinois	52	7	*	20	103	*	97	6	195
Indiana	36	4	*	12	76	*	67	5	125
Iowa	84	12	*	38	171	*	88	8	232
Kansas	27	9	*	26	67	*	68	9	126
Kentucky	15	*	11	28	50	*	29	8	98
Louisiana	18	*	19	21	43	*	24	6	79
Maine	13	5	*	9	20	*	11	5	39
Maryland	*	5	18	16	*	*	22	5	68
Massachusetts	*	*	16	11	*	*	20	5	62
Michigan	35	6	*	25	72	*	50	7	128
Minnesota	44	8	*	22	84	*	54	5	130
Mississippi	19	4	*	14	30	*	15	6	60
Missouri	36	7	*	19	72	*	71	7	144
Montana	22	*	13	*	33	*	34	7	64
Nebraska	31	5	*	17	58	*	48	7	103

Figure 36 - Continued
Providers of Connections by Technology by State as of June 30, 2019
(Connections over 200 kbps in at least one direction, in thousands)

<i>State</i>	<i>ADSL</i>	<i>SDSL</i>	<i>Other Wireline¹</i>	<i>Cable Modem</i>	<i>Fiber</i>	<i>Satellite</i>	<i>Fixed Wireless</i>	<i>Mobile Wireless</i>	<i>Total</i>
Nevada	18	6	13	*	34	*	27	5	67
New Hampshire	9	4	*	6	21	*	8	5	36
New Jersey	12	*	27	10	*	*	11	4	61
New Mexico	20	*	18	11	33	*	33	7	70
New York	34	*	27	21	76	*	37	7	126
North Carolina	22	6	*	28	59	*	27	6	102
North Dakota	21	6	*	9	32	*	12	6	48
Northern Mariana Isl	*	0	*	*	*	0	0	*	*
Ohio	34	*	27	31	72	*	63	4	149
Oklahoma	38	7	*	14	60	*	48	11	113
Oregon	38	6	*	17	60	*	46	6	103
Pennsylvania	25	5	22	25	*	*	30	9	108
Puerto Rico	*	0	4	*	7	*	11	5	21
Rhode Island	*	*	7	*	*	*	*	4	25
South Carolina	18	4	*	17	35	*	13	6	55
South Dakota	22	*	14	9	34	*	20	8	72
Tennessee	23	6	*	22	70	*	34	7	112
Texas	68	14	*	35	134	*	157	11	263
Utah	18	*	17	13	32	*	38	8	74
Vermont	9	*	7	7	20	*	7	6	35
Virgin Islands	*	0	*	*	*	*	4	*	8
Virginia	24	6	*	20	70	*	42	6	114
Washington	26	7	*	27	63	*	57	6	121
West Virginia	*	*	10	17	23	*	16	6	57
Wisconsin	42	*	22	*	74	*	47	6	117
Wyoming	13	*	8	8	22	*	23	8	48
Total	717	122	223	381	1,304	6	1,237	70	2,207

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Figures may not sum to totals due to rounding.

Source: FCC Form 477.

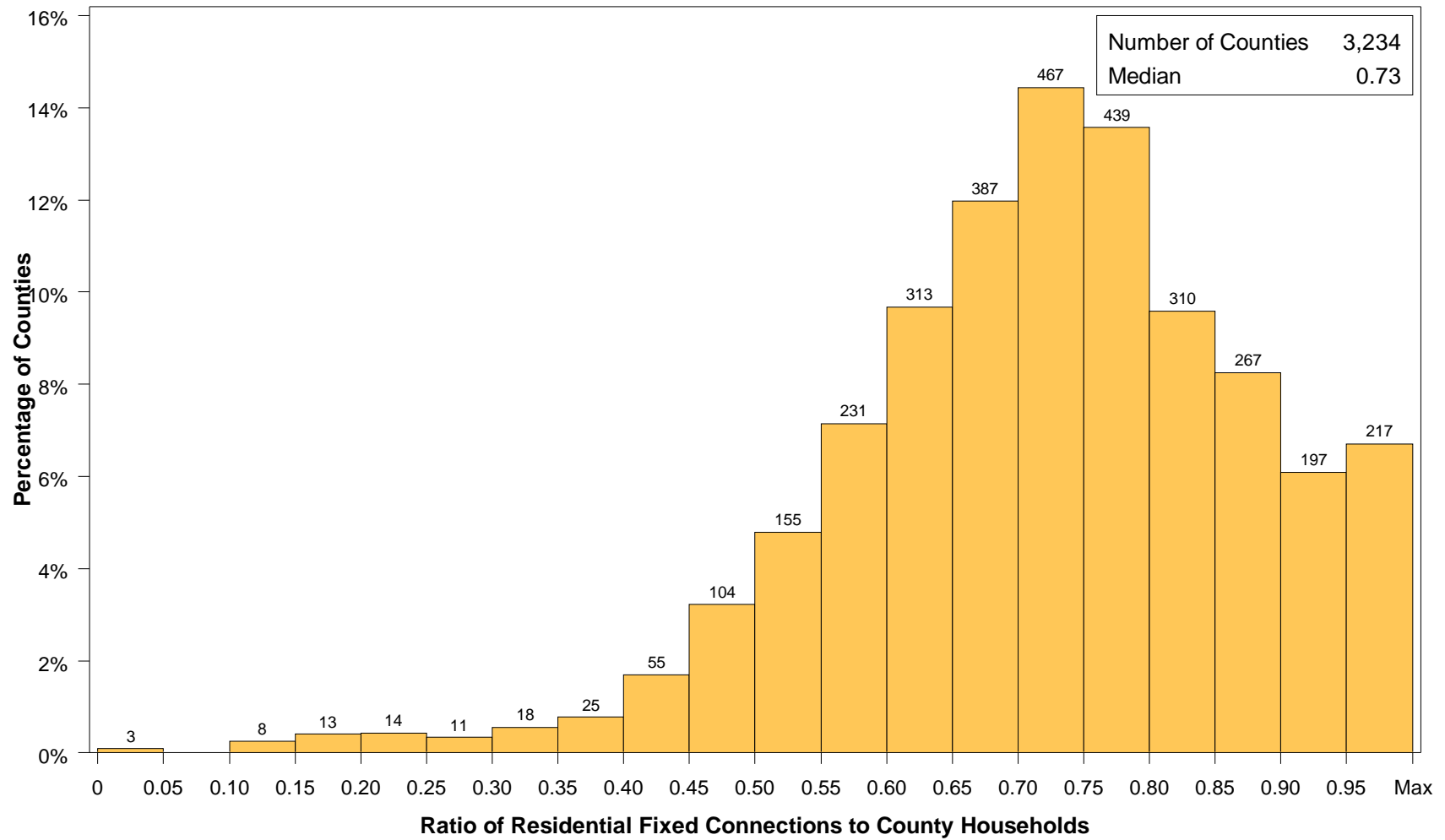
SECTION 4

SUMMARY STATISTICS: COUNTIES AND CENSUS TRACTS

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Figure 37
Distribution of Counties by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to County Households as of June 30, 2019



Note: Ratios over 1 were set to 1. See Technical Notes at the end of the report.
 Sources: FCC Form 477; 2015-2019 ACS 5-year estimates; and Census 2010.

Figure 38
Distribution of Counties by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction
to County Households by Technology as of June 30, 2019

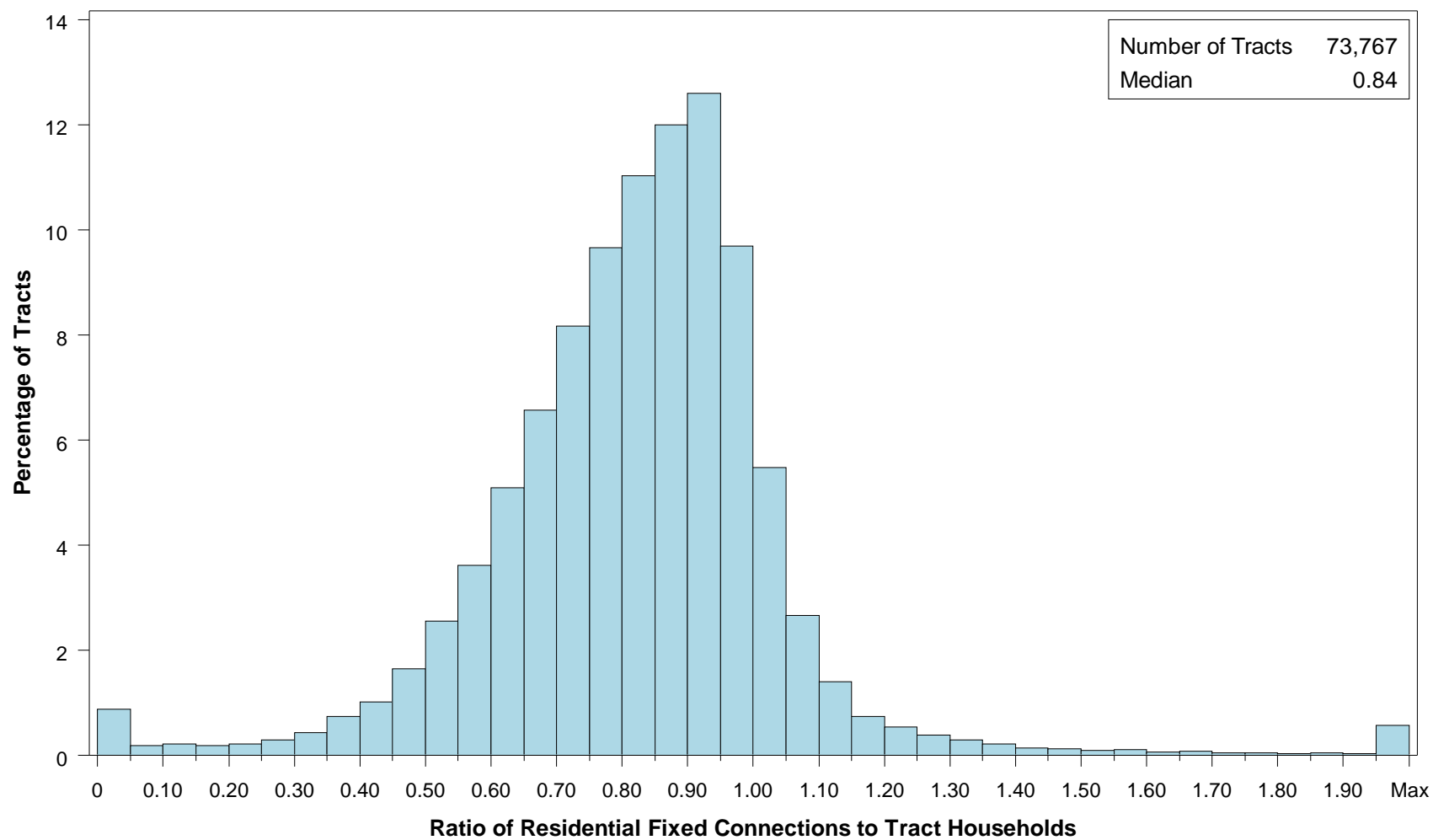
Technology	Ratio of Residential Fixed Connections to County Households										100% or more
	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	
aDSL	1.5	7.5	9.8	31.4	25.5	13.8	6.2	2.3	1.6	0.2	0.2
sDSL	94.3	5.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Wireline	93.9	6.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cable Modem	11.3	7.3	6.0	12.9	12.9	12.5	11.8	11.8	11.4	1.5	0.6
FTTP	15.5	44.2	11.1	11.7	6.6	3.4	2.5	2.1	2.4	0.3	0.1
Satellite	0.4	64.2	22.9	10.9	1.3	0.3	0.0	0.0	0.0	0.0	0.0
Fixed Wireless	14.8	60.5	12.5	8.0	2.6	1.1	0.3	0.1	0.1	0.0	0.1
Total	0.1	0.0	0.0	0.6	0.8	1.3	4.9	11.9	49.7	26.3	4.4

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

Note: Figures may not sum to totals due to rounding.

Sources: FCC Form 477; 2015-2019 ACS 5-year estimates; and Census 2010.

Figure 39
Distribution of Census Tracts by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households as of June 30, 2019



Note: Ratios over 2 were set to 2. See Technical Notes at the end of the report.
 Sources: FCC Form 477; 2015-2019 ACS 5-year estimates; and Census 2010.

Figure 40
Distribution of Census Tracts by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households by Technology as of June 30, 2019

Technology	Ratio of Residential Fixed Connections to Tract Households										100% or more
	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	
aDSL	3.5	25.2	16.0	26.0	16.5	7.4	2.9	1.4	0.8	0.2	0.2
sDSL	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Wireline	99.0	0.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cable Modem	4.8	2.7	1.5	3.6	5.2	10.0	15.4	19.5	27.1	8.2	2.0
FTTP	34.1	20.9	8.8	11.8	7.9	5.9	4.7	2.9	2.5	0.4	0.1
Satellite	23.8	65.9	5.5	3.7	0.8	0.2	0.0	0.0	0.0	0.0	0.0
Fixed Wireless	68.5	24.7	3.0	2.3	0.9	0.4	0.2	0.1	0.1	0.0	0.0
Total	0.8	0.1	0.2	0.4	0.5	1.2	2.7	6.2	29.5	45.4	13.0

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

Note: Figures may not sum to totals due to rounding.

Sources: FCC Form 477; 2015-2019 ACS 5-year estimates; and Census 2010.

Figure 41
Percentage of Developed Census Blocks with Residential Fixed Service by Technology as of June 30, 2019
 (Internet Access Service over 200 kbps in at least one direction)

<i>Technology</i>	<i>Number of Providers</i>							
	<i>Zero</i>	<i>One</i>	<i>Two</i>	<i>Three</i>	<i>Four</i>	<i>Five</i>	<i>Six</i>	<i>Seven or More</i>
aDSL	22.4	75.1	2.4	0.1	0.0	0.0	0.0	0.0
sDSL	99.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Other Wireline ¹	99.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Cable Modem	84.9	14.6	0.5	0.0	0.0	0.0	0.0	0.0
FTTP	72.2	26.2	1.5	0.1	0.0	0.0	0.0	0.0
Satellite	0.0	0.1	0.9	98.9	0.0	0.0	0.0	0.0
Fixed Wireless	50.8	28.6	13.8	5.6	1.0	0.2	0.0	0.0
aDSL and/or Cable Modem and/or FTTP	14.3	65.8	17.9	1.9	0.1	0.0	0.0	0.0
Any Technology	0.0	0.1	0.1	4.0	14.7	41.3	25.0	14.8

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.
 Note: Figures may not sum to totals due to rounding. The number of providers in a census block does not necessarily reflect the number of choices available to a particular household, and does not purport to measure competition. Providers may list a census block on Form 477 if service can be provided to at least one location in the block. Developed census blocks are those with housing units based on the 2010 census.
 Sources: FCC Form 477 and Census 2010.

Figure 42
Distribution of Counties by Ratio of Residential Fixed Connections to County Households by State as of June 30, 2019
(Connections over 200 kbps in at least one direction)

Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to County Households												
State	Counties	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	100% or more
Alabama	67	0	0	0	0	0	0	14	12	31	10	0
Alaska	29	0	0	0	1	0	2	2	2	9	10	3
American Samoa	5	2	0	0	0	2	0	1	0	0	0	0
Arizona	15	0	0	0	0	0	0	0	2	5	8	0
Arkansas	75	0	0	0	0	0	3	13	28	31	0	0
California	58	0	0	0	0	0	0	1	0	12	42	3
Colorado	64	0	0	0	0	0	0	2	7	19	22	14
Connecticut	8	0	0	0	0	0	0	0	0	0	8	0
Delaware	3	0	0	0	0	0	0	0	0	0	2	1
District of Columbia	1	0	0	0	0	0	0	0	0	0	1	0
Florida	67	0	0	0	0	0	0	0	6	17	32	12
Georgia	159	0	0	0	0	3	5	13	29	63	38	8
Guam	1	0	0	0	0	0	0	0	0	1	0	0
Hawaii	5	0	0	0	0	0	0	0	0	0	2	3
Idaho	44	0	0	0	0	0	0	1	4	23	11	5
Illinois	102	0	0	0	0	0	0	3	19	60	20	0
Indiana	92	0	0	0	0	0	0	0	14	60	18	0
Iowa	99	0	0	0	0	0	0	0	4	82	12	1
Kansas	105	0	0	0	0	0	0	3	6	75	21	0
Kentucky	120	0	0	0	0	0	1	4	14	74	27	0
Louisiana	64	0	0	0	0	0	1	10	14	29	10	0
Maine	16	0	0	0	0	0	0	0	0	2	8	6
Maryland	24	0	0	0	0	0	0	0	0	7	16	1
Massachusetts	14	0	0	0	0	0	0	0	0	0	11	3
Michigan	83	0	0	0	0	0	0	1	7	50	21	4
Minnesota	87	0	0	0	0	0	0	1	2	57	25	2
Mississippi	82	0	0	0	0	1	6	22	30	20	2	1
Missouri	115	0	0	0	0	0	2	10	25	61	15	2
Montana	56	0	0	0	0	0	0	0	3	31	20	2
Nebraska	93	0	0	0	0	0	0	3	12	68	10	0

Figure 42 - Continued
Distribution of Counties by Ratio of Residential Fixed Connections to County Households by State as of June 30, 2019
(Connections over 200 kbps in at least one direction)

Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to County Households												
State	Counties	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	100% or more
Nevada	17	0	0	0	0	0	1	1	1	9	5	0
New Hampshire	10	0	0	0	0	0	0	0	0	0	7	3
New Jersey	21	0	0	0	0	0	0	0	0	0	18	3
New Mexico	33	0	0	0	0	0	0	2	2	17	8	4
New York	62	0	0	0	0	0	1	0	0	24	31	6
North Carolina	100	0	0	0	0	0	0	0	3	48	42	7
North Dakota	53	0	0	0	0	0	0	0	2	30	17	4
Northern Mariana Isl	4	1	0	0	0	0	1	1	1	0	0	0
Ohio	88	0	0	0	0	0	0	1	7	56	23	1
Oklahoma	77	0	0	0	0	0	2	9	23	38	4	1
Oregon	36	0	0	0	0	0	0	1	0	16	16	3
Pennsylvania	67	0	0	0	0	0	0	0	1	38	25	3
Puerto Rico	78	0	0	0	20	17	10	13	16	2	0	0
Rhode Island	5	0	0	0	0	0	0	0	0	0	4	1
South Carolina	46	0	0	0	0	0	0	2	10	20	11	3
South Dakota	66	0	0	0	0	0	1	1	4	43	15	2
Tennessee	95	0	0	0	0	0	0	1	16	65	13	0
Texas	254	0	0	0	0	0	2	15	39	137	53	8
Utah	29	0	0	0	0	0	0	0	1	6	16	6
Vermont	14	0	0	0	0	0	0	0	0	0	10	4
Virgin Islands	3	0	0	0	0	0	0	0	1	1	1	0
Virginia	134	0	0	0	0	1	5	6	15	63	41	3
Washington	39	0	0	0	0	0	0	1	0	14	22	2
West Virginia	55	0	0	0	0	1	0	0	3	42	9	0
Wisconsin	72	0	0	0	0	0	0	0	1	39	26	6
Wyoming	23	0	0	0	0	0	0	1	0	11	10	1
Total	3,234	3	0	0	21	25	43	159	386	1606	849	142

Note: Figures may not sum to totals due to rounding. See Technical Notes at the end of the report.

Sources: FCC Form 477; 2015-2019 ACS 5-year estimates (Households for U.S. and District of Columbia); Census 2010 (Households for Puerto Rico, American Samoa, Guam, Northern Mariana Islands and U.S. Virgin Islands).

Figure 43
Distribution of Census Tracts by Ratio of Residential Fixed Connections to Tract Households by State as of June 30, 2019
(Connections over 200 kbps in at least one direction)

Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households												
State	Tracts	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	100% or more
Alabama	1,179	5	0	0	0	11	49	92	188	446	320	68
Alaska	167	1	0	1	4	1	7	4	13	51	64	21
American Samoa	18	2	0	0	0	7	5	1	1	0	1	1
Arizona	1,526	12	2	8	13	13	15	43	99	399	633	289
Arkansas	686	1	0	0	0	7	44	102	140	271	111	10
California	8,036	56	3	3	10	15	42	55	253	1,731	4,805	1,063
Colorado	1,249	14	1	0	0	2	3	12	29	262	692	234
Connecticut	829	4	0	0	1	0	1	5	15	137	528	138
Delaware	215	1	0	0	0	1	0	0	4	50	100	59
District of Columbia	179	1	0	0	0	0	0	1	6	57	75	39
Florida	4,199	39	3	0	4	6	15	55	125	807	1,904	1,241
Georgia	1,964	11	1	0	1	10	35	95	160	572	790	289
Guam	56	6	0	0	3	4	4	4	7	8	6	14
Hawaii	326	13	0	0	0	1	0	2	4	52	137	117
Idaho	298	0	0	0	1	3	3	5	15	123	125	23
Illinois	3,121	6	1	0	4	6	21	87	256	1,171	1,379	190
Indiana	1,508	4	1	0	4	4	19	47	150	657	530	92
Iowa	825	4	0	0	0	0	5	15	51	503	225	22
Kansas	770	10	0	0	1	2	1	18	59	343	282	54
Kentucky	1,115	10	0	1	0	7	17	36	87	429	465	63
Louisiana	1,136	12	1	1	1	10	25	86	147	427	355	71
Maine	351	0	0	0	0	0	0	0	3	83	172	93
Maryland	1,394	9	0	0	0	1	7	20	50	272	777	258
Massachusetts	1,471	12	0	0	2	1	2	2	22	240	942	248
Michigan	2,767	29	1	2	10	11	51	139	252	827	1,235	210
Minnesota	1,335	4	0	0	1	1	6	19	54	480	679	91
Mississippi	661	4	0	0	0	7	40	120	144	226	105	15
Missouri	1,393	4	0	0	2	6	31	80	169	480	525	96
Montana	271	2	0	0	1	0	3	7	7	120	113	18
Nebraska	532	3	0	1	0	0	2	8	39	227	217	35

Figure 43 - Continued
Distribution of Census Tracts by Ratio of Residential Fixed Connections to Tract Households by State as of June 30, 2019
(Connections over 200 kbps in at least one direction)

Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households												
State	Tracts	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	100% or more
Nevada	683	5	0	1	0	1	9	14	24	180	328	121
New Hampshire	294	2	0	0	0	0	0	0	3	28	183	78
New Jersey	2,004	9	0	0	1	3	4	1	10	251	1,225	500
New Mexico	499	2	4	2	4	6	16	20	57	184	168	36
New York	4,900	79	1	5	13	17	24	32	126	1,373	2,377	853
North Carolina	2,183	18	1	0	2	0	7	16	124	711	929	375
North Dakota	205	0	0	0	0	0	0	3	9	96	72	25
Northern Mariana Isl	22	2	0	0	0	2	4	6	1	7	0	0
Ohio	2,946	8	0	0	4	2	16	70	202	1,171	1,300	173
Oklahoma	1,046	0	0	2	4	15	38	77	194	373	267	76
Oregon	827	2	0	0	0	0	2	7	22	227	498	69
Pennsylvania	3,217	27	1	0	6	4	7	47	122	1,140	1,617	246
Puerto Rico	903	18	61	111	190	123	126	81	41	47	29	76
Rhode Island	241	1	0	0	0	0	0	2	1	27	169	41
South Carolina	1,097	12	0	0	1	11	12	56	109	356	372	168
South Dakota	222	0	0	0	2	0	2	4	20	100	74	20
Tennessee	1,497	21	1	0	1	9	20	74	164	591	482	134
Texas	5,253	39	0	4	5	27	90	212	517	1,735	1,900	724
Utah	588	4	2	0	3	0	1	1	11	120	347	99
Vermont	184	1	0	0	0	0	0	1	1	31	99	51
Virgin Islands	29	0	0	0	1	2	1	2	9	10	3	1
Virginia	1,895	23	0	2	2	14	30	59	120	465	908	272
Washington	1,446	2	1	0	1	3	4	12	23	264	937	199
West Virginia	484	0	0	1	3	1	9	21	49	219	146	35
Wisconsin	1,393	3	1	0	1	4	2	6	40	536	727	73
Wyoming	132	1	0	0	1	0	2	0	3	53	64	8
Total	73,767	558	87	145	308	381	879	1,984	4,551	21,746	33,513	9,615

Note: Figures may not sum to totals due to rounding. See Technical Notes at the end of the report.

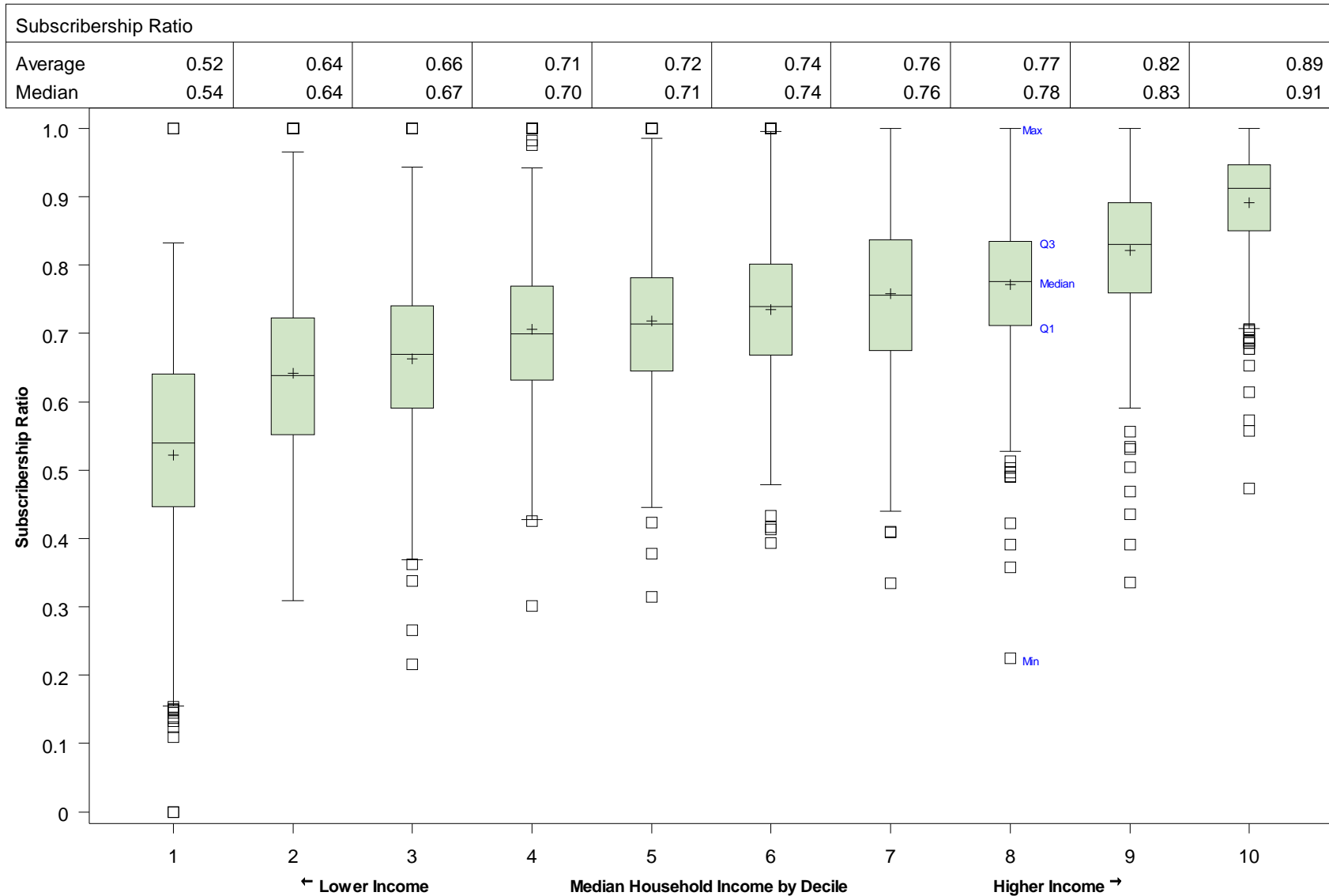
Sources: FCC Form 477; 2015-2019 ACS 5-year estimates (Households for U.S. and District of Columbia); Census 2010 (Households for Puerto Rico, American Samoa, Guam, Northern Mariana Islands and U.S. Virgin Islands).

SECTION 5
CORRELATED RESULTS: DEMOGRAPHIC MEASURES

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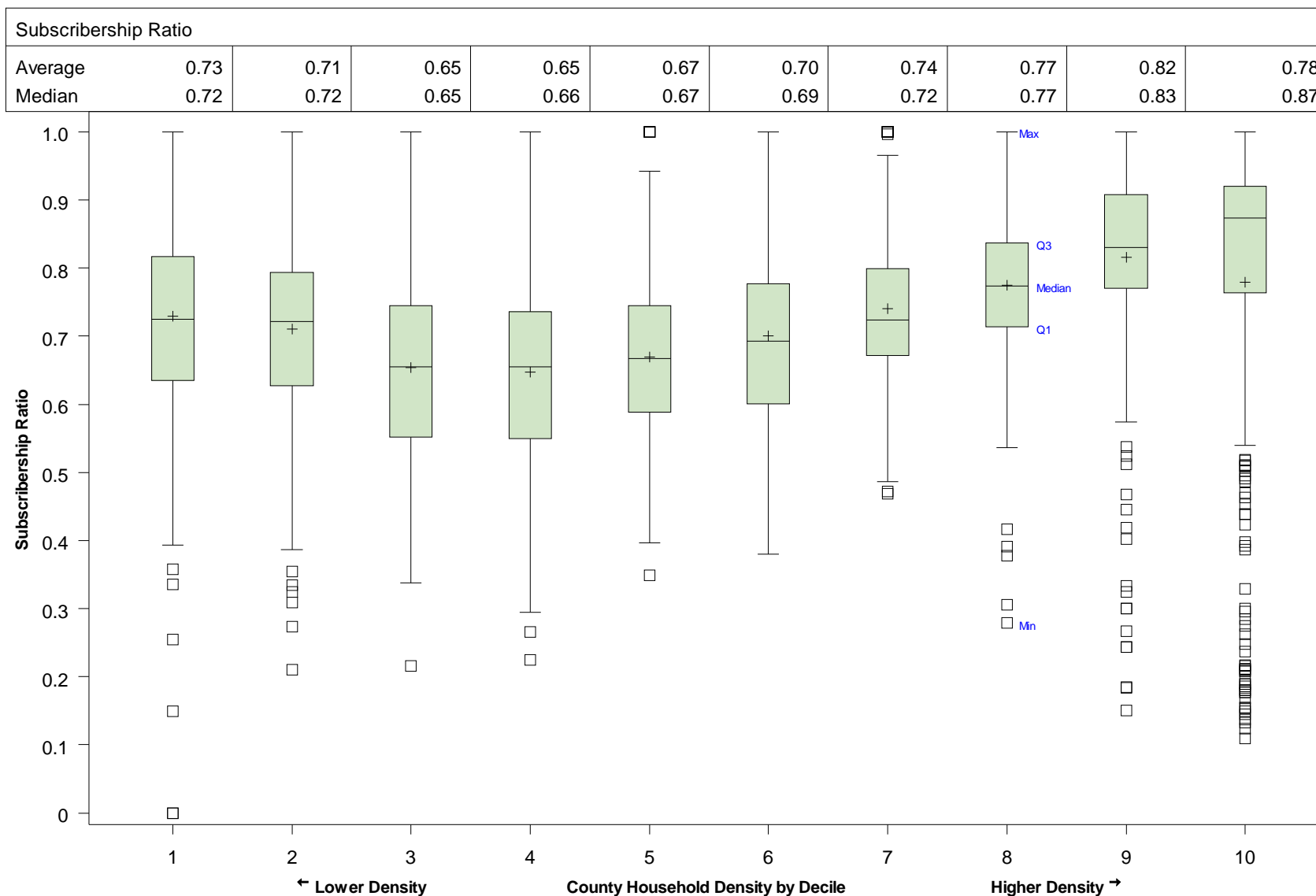
Figure 44
Subscribership Ratio Distributions by Income Deciles as of June 30, 2019



Note: Each box plot shows the distribution of residential subscribership to connections over 200 kbps in at least one direction for counties in the income decile. Some of the features are labeled, but note also that + denotes the position of the average residential subscribership ratio taken across all counties in the decile; ⊥ is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and □ is any data point beyond $Q1-1.5(Q3-Q1)$ or $Q3+1.5(Q3-Q1)$. Ratios greater than 1 were set to 1.

Sources: FCC Form 477; 2015-2019 ACS 5-year Estimates; Census 2010.

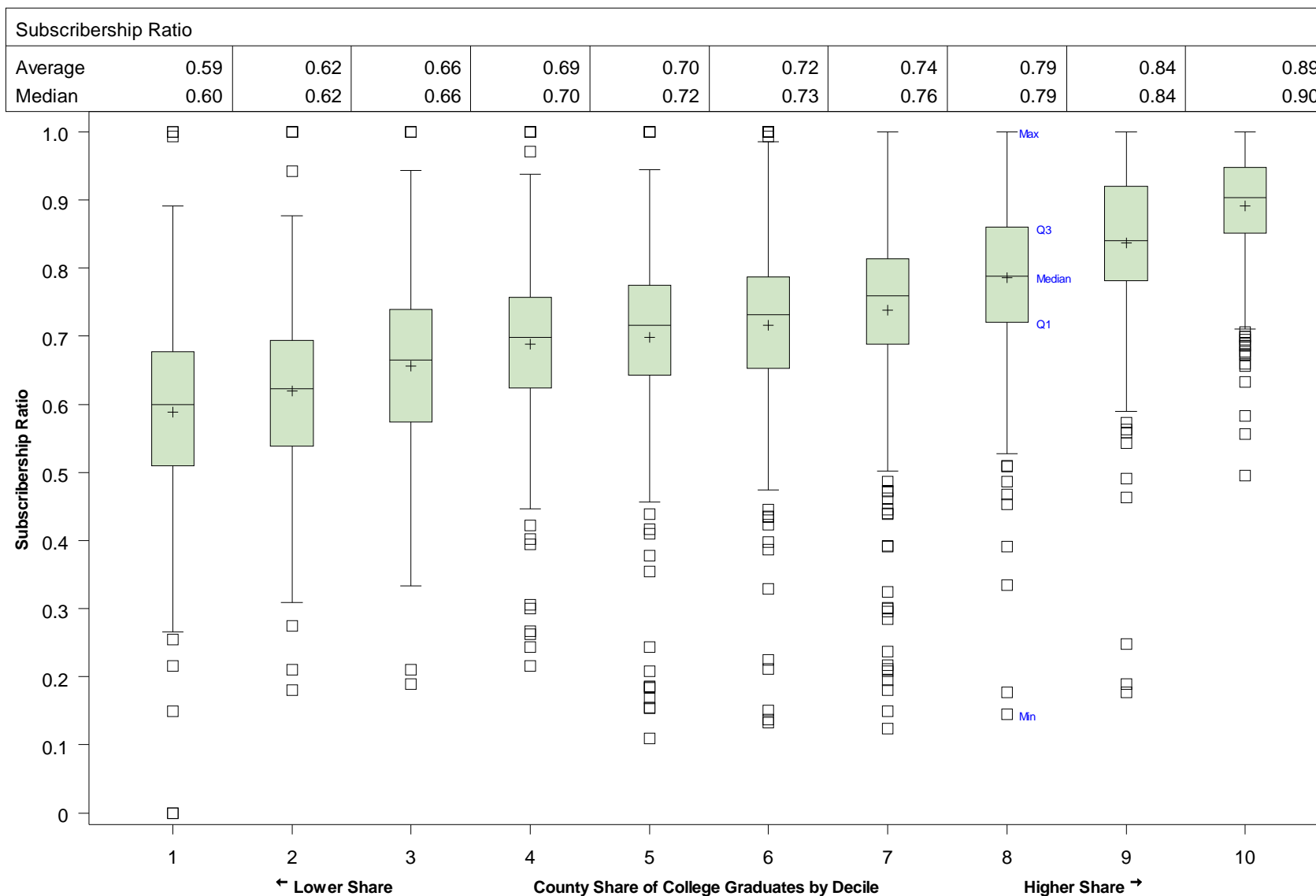
Figure 45
Subscribership Ratio Distributions by Density Deciles as of June 30, 2019



Note: Each box plot shows the distribution of residential subscribership to connections over 200 kbps in at least one direction for counties in the density decile. Some of the features are labeled, but note also that + denotes the position of the average residential subscribership ratio taken across all counties in the decile; \perp is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and \square is any data point beyond $Q1-1.5(Q3-Q1)$ or $Q3+1.5(Q3-Q1)$. Ratios greater than 1 were set to 1.

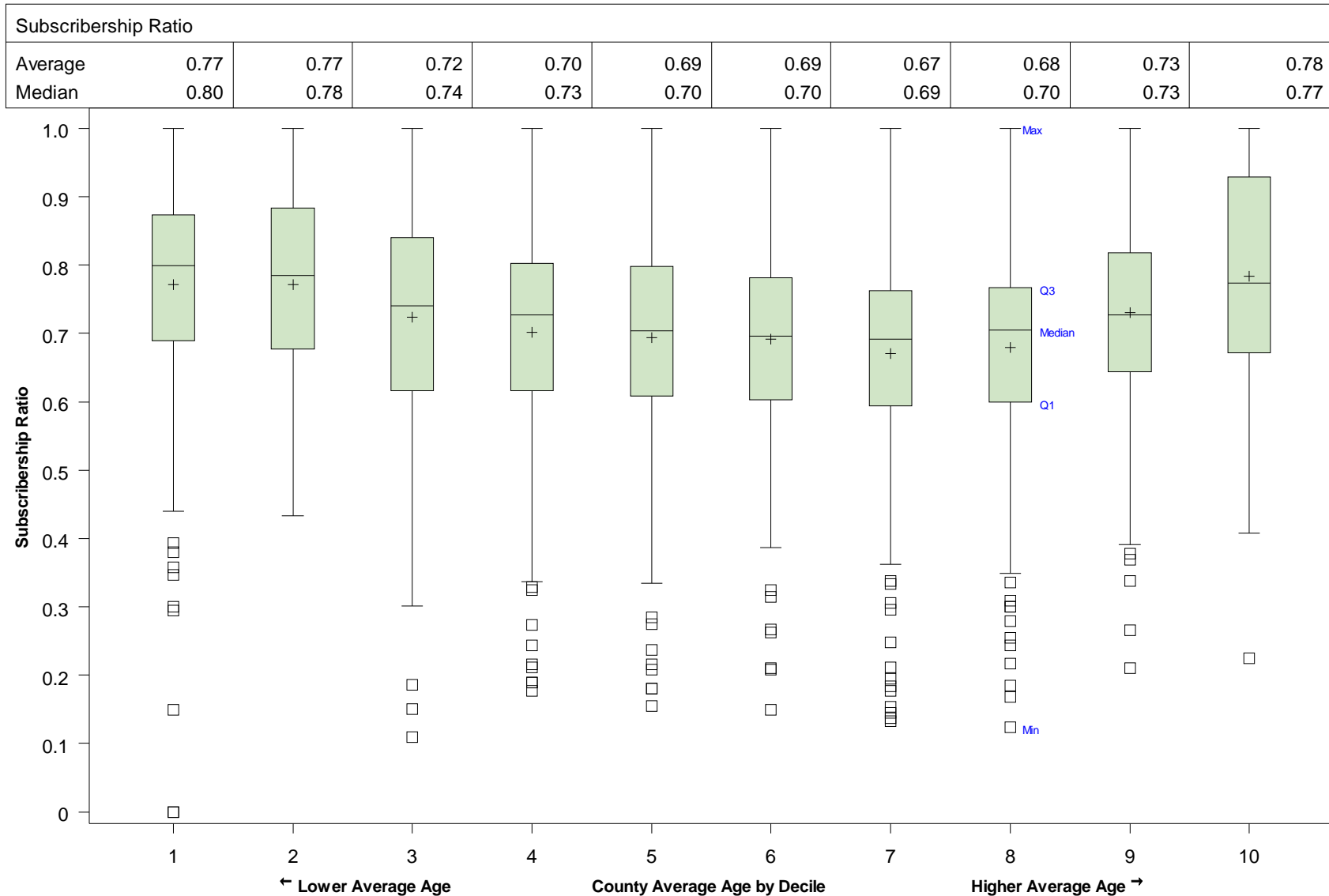
Sources: FCC Form 477; 2015-2019 ACS 5-year Estimates; Census 2010.

Figure 46
Subscribership Ratio Distributions by Share of Population with a College Degree (in Deciles) as of June 30, 2019



Note: Each box plot shows the distribution of residential subscribership to connections over 200 kbps in at least one direction for counties in the share decile. Some of the features are labeled, but note also that + denotes the position of the average residential subscribership ratio taken across all counties in the decile; ⊥ is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and □ is a data point beyond $Q1-1.5(Q3-Q1)$ or $Q3+1.5(Q3-Q1)$. Ratios greater than 1 were set to 1.
 Sources: FCC Form 477; 2015-2019 ACS 5-year Estimates; Census 2010.

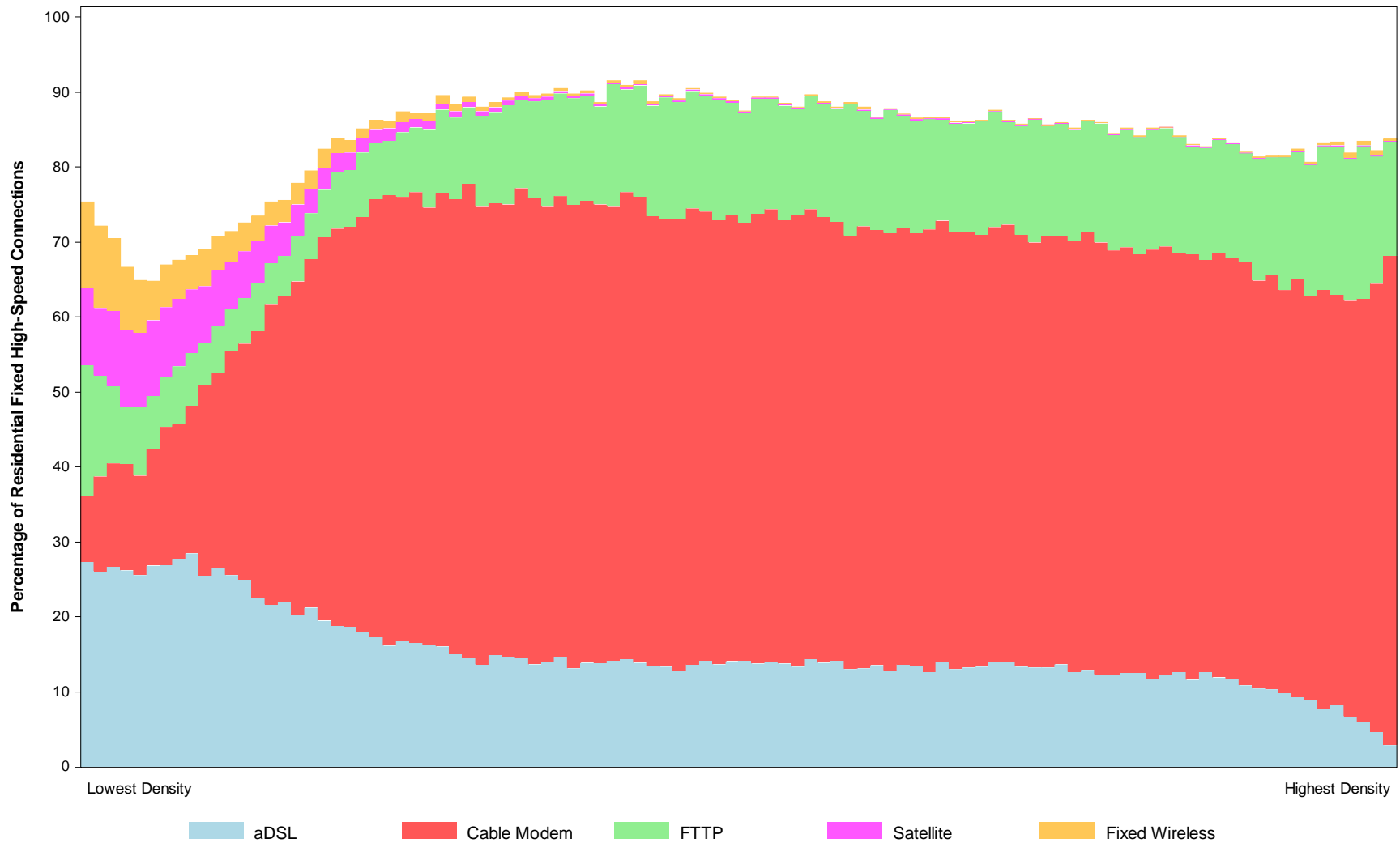
Figure 47
Subscribership Ratio Distributions by Average Age of County Population (in Deciles) as of June 30, 2019



Note: Each box plot shows the distribution of residential subscribership to connections over 200 kbps in at least one direction for counties in the average age decile. Some of the features are labeled, but note also that + denotes the position of the average residential subscribership ratio taken across all counties in the decile; ⊥ is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and □ is a data point beyond $Q1-1.5(Q3-Q1)$ or $Q3+1.5(Q3-Q1)$. Ratios greater than 1 were set to 1.

Sources: FCC Form 477; 2015-2019 ACS 5-year Estimates; Census 2010.

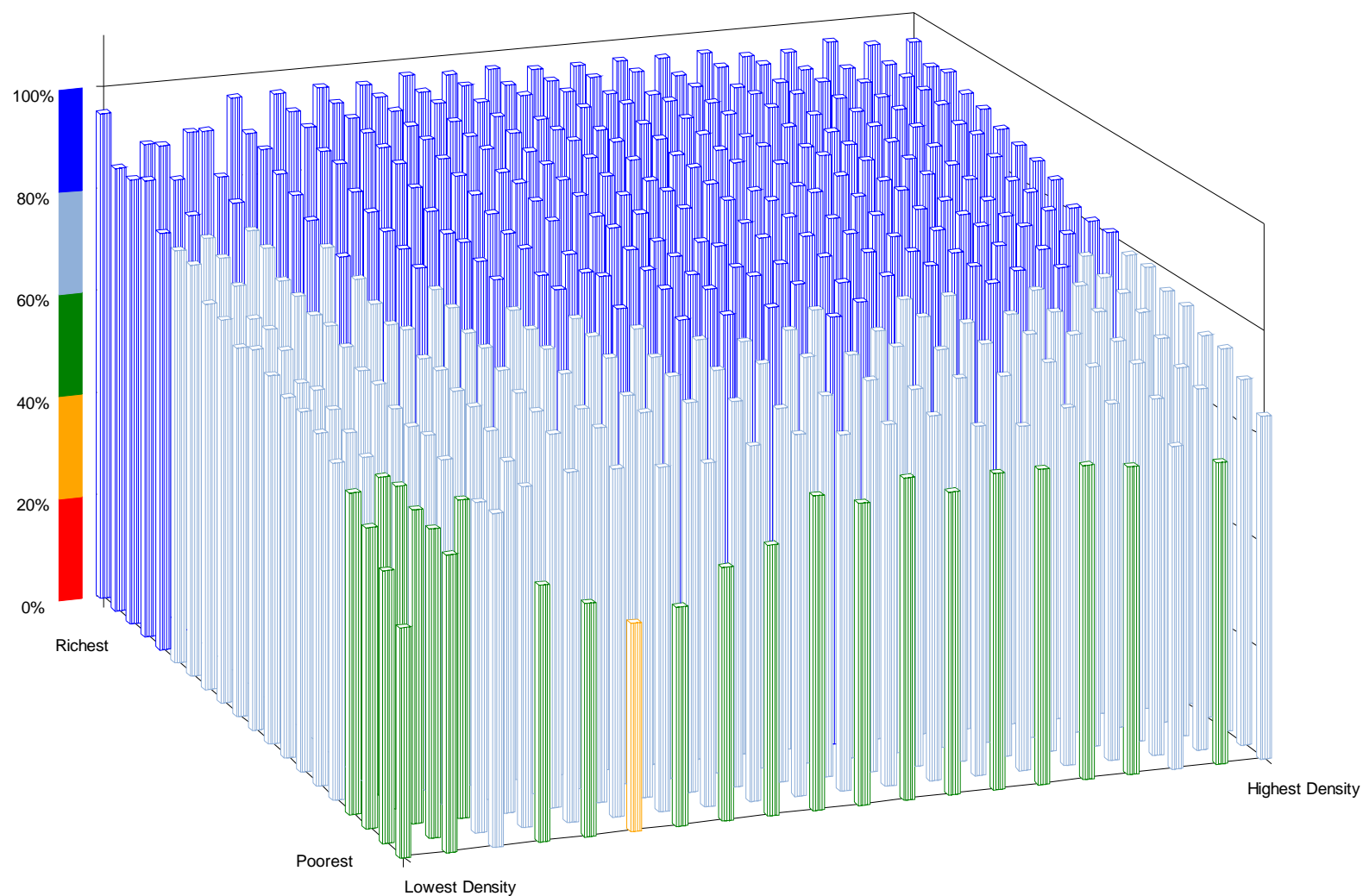
Figure 48
Subscriber Ratios by Technology and Tract Household Density as of June 30, 2019
(Residential fixed connections over 200 kbps in at least one direction)



This chart shows subscribership ratios by technology and household density. Tracts were grouped into 100 density percentiles based on households per square mile, calculated as the ratio of estimated tract households to tract land area from the Census Bureau. For each percentile, the height of the bar represents the household-weighted average ratio of residential fixed connections to households across tracts in the percentile.

Sources: FCC Form 477; 2015-2019 ACS 5-year estimates; and Census 2010.

Figure 49
Average Subscribership Ratios by Income and Household Density as of June 30, 2019
(Residential fixed connections over 200 kbps in at least one direction by Tract)



This chart shows subscribership ratios by household density and income quantiles. Tracts were grouped into 400 density/income quantiles based on households per square mile, calculated as the ratio of estimated tract households to tract land area, and median household income. For each quantile, the height of the grid represents the household-weighted average ratio of residential fixed connections to households across tracts in the decile.

Sources: FCC Form 477; 2015-2019 ACS 5-year estimates; and Census 2010.

Technical Notes

General

The information presented in this report is based on data from FCC Form 477. Through Form 477, facilities-based broadband providers submit information to the FCC about where they offer and have subscribers to Internet access services over 200 kilobits per second (kbps) in at least one direction. In June 2013, the Commission adopted several changes to Form 477.¹ Detailed information about those changes and about the Form 477 reporting requirements in general is available at www.fcc.gov/form477. Due to technical difficulties in 2014 with the redesigned Form 477 filing interface, the filing deadline for Form 477 data as of June 30, 2014 was moved to December 11, 2014. Because of that delay, the Commission staff were not able to perform their typical process of identifying anomalies or errors in the data, following up with filers, and requesting updates to the data where appropriate – a process which usually generates a significant number of corrections and hence a more accurate Form 477 data set.

Form 477 collects information about *Internet access connections in service* to end-user locations that are advertised to deliver information to and/or from the end user – that is, in at least one direction – at transfer rates (speeds) above 200 kilobits per second (kbps). Information is collected about the number of connections by the advertised speeds associated with each product subscribed to in the relevant geographic area, census tracts for fixed and states for mobile. Fixed providers report connections by the maximum advertised upload and download speeds, while mobile providers report connections by minimum advertised upload and download speeds. Fixed connections are further categorized by the technology employed by the part of the connection that terminates at the end-user location. Wherever a *number of providers* is cited in this report, multiple Form 477 filers within a holding company structure count as one provider.

“End users” are residential, business, institutional, or government entities who use services for their own purposes and who do not resell such services to other entities. *Facilities-based providers* report information about connections they provide directly to their own end-user customers and also connections that they provide to Internet Service Providers for resale to end users. For Form 477 purposes, the facilities-based provider of a connection is the entity that owns the portion of the physical facility that terminates at the end-user location, obtains an unbundled network element (UNE), special access line, or other leased facility that terminates at the end-user location and provisions/equips it as a connection that transfers information at rates over 200 kbps in at least one direction, or provisions/equips a wireless channel that transfers information at rates over 200 kbps in at least one direction to the end-user location over licensed spectrum or over spectrum that the provider uses on an unlicensed basis.

The mutually exclusive Form 477 *technology categories* are: asymmetric Digital Subscriber Line (aDSL in this report); symmetric Digital Subscriber Line (sDSL); other copper wireline; cable modem; optical carrier / fiber to the end user; satellite; terrestrial fixed wireless (using licensed or unlicensed spectrum); mobile wireless; and all other (which is included to capture deployment of additional technologies over time). In the Form 477 data collection, aDSL-based services delivered over fiber-to-the-node architecture are reported in the aDSL category. The other wireline category comprises T1/DS1, T3/DS3, and other copper-based connections, not elsewhere categorized, that deliver *Internet access* service at the end-user

¹ *Modernizing the FCC Form 477 Data Program*, WC Docket No. 11-10, Report and Order, 28 FCC Rcd 9887 (2013). See also *High-Speed Services for Internet Access: Status as of December 31, 2014* (March 2016) at 1-2, available at <https://www.fcc.gov/reports-research/reports/internet-access-services-reports/internet-access-services-reports>.

location. Ethernet connections delivering Internet access service are reported in the other wireline category if the connection terminates over copper and in the FTTP category if the connection terminates over fiber. Connections deployed over hybrid fiber-coax (HFC) architecture are reported in the cable modem category. Wireless ISPs (WISPs) report in the fixed wireless category if providing service to dispersed, fixed end-user locations and report in the mobile wireless category if providing a commercial service that can be received at any location within a service footprint. Wireless local area networks (such as Wi-Fi hotspots) that only enable local distribution and sharing of a premises connection are not included, although the shared premises connection is included.

Numbers of connections presented in this report are not adjusted for the number of persons at a single end-user location who have access to, or who use, the Internet access services delivered over the connection to that location.

Numbers of residential connections are estimated based on the total connections and percentage-residential connections information reported on Form 477.

Census tracts

Since the collection of data as of December 31, 2008, facilities-based providers of reportable fixed-location Internet access connections have been reporting connection counts at the census tract level of detail. Facilities-based mobile wireless providers report connection counts by state rather than census tract.

The census tract-level data summarized in this report were collected for tracts in the 2010 decennial census. For the purposes of this report, there are 73,767 census tracts because we exclude census tracts delineated specifically to cover large bodies of water.

About 110 of the census tracts have population but no households because the population resides in group living quarters. For the purpose of estimating residential subscribership rates by census tract, we assume these census tracts have no reportable *residential* Internet access service because persons residing in group quarters would have Internet access over a business connection provided to the operator of the group quarters. Therefore, these census tracts are included in the “zero” column.

Ratios of residential fixed-location connections to households that exceed 100%

We estimate the share of households with fixed-location connections in individual census tracts by taking the ratio of the reported number of fixed-location residential service connections to the estimated number of households. We continue to find “outlier” estimates at or above 100% and to find that the number of outliers is substantially reduced when estimates are made for individual counties rather than for individual census tracts.

Possible explanations of ratios at or above 100% include: (1) geocoding misallocations of service locations to census tracts; (2) proper allocation of connections to the county level by some filers, but improper allocation of all connections to a single tract in the county; (3) possible overestimation of residential connections in service plans for which the customer base is primarily residential; and (4) connections at seasonally or occasionally occupied housing units, such as vacation homes, while the household is counted elsewhere. The numbers of households in census tracts that were used to generate the estimated ratios are themselves estimates (from Census 2015-2019 ACS 5-year estimates), which could have an independent effect.

Maps showing residential subscribership rates by census tract

The two maps based on estimated Internet access connections over 200 kbps in at least one direction per 1,000 households (that is, estimated household subscribership rates) exclude all connections identified as business connections and necessarily exclude residential mobile wireless connections (which are reported for the state but not for individual census tracts).

Glossary

Term	Definition
aDSL	Asymmetric Digital Subscriber Line: A digital local loop typically using copper facilities and providing greater bandwidth in one direction than the other.
Cable modem service	A service which offers customers access to the Internet over a cable system.
Downstream speed	Speed of transmission from the Internet to the end user.
End users	Residential, business, institutional, or government entities who use services for their own purposes and who do not resell such services to other entities.
Facilities-based provider	Entity that owns the portion of the physical facility that terminates at the end-user location, obtains an unbundled network element (UNE), special access line, or other leased facility that terminates at the end-user location and provisions/equips it as a connection that transfers information at rates over 200 kbps in at least one direction, or provisions/equips a wireless channel that transfers information at rates over 200 kbps in at least one direction to the end-user location over licensed spectrum or over spectrum that the provider uses on an unlicensed basis.
Fixed wireless	A radio communication service between specified fixed points.
Fixed technologies	All technologies other than terrestrial mobile wireless.
FTTH or FTTP	Fiber to the Home (Premises): A network access architecture in which optical fiber is deployed all the way to the customer's home (premises).
Internet access service	Service that provides end users access to the Internet.
ISPs	Internet Service Providers: Companies or organizations that provide Internet access service (see above).
Mobile wireless service	A radio communication service between mobile and fixed stations, or between mobile stations.
Mobile wireless provider	Provider of mobile wireless service (see above).
Other wireline	All copper-wire based technologies other than DSL technologies; Ethernet over copper and T-1 are examples.
Power line	Internet access service delivered over electric power transmission lines.
Satellite communications	A telecommunications service provided via one or more satellite relays and their associated uplinks and downlinks.
sDSL	Symmetric Digital Subscriber Line: DSL technology that provides equal bandwidth for both uploads and downloads.
Speed tiers	Sub-groupings defined by ranges of upstream speeds and downstream speeds.
Upstream speed	Speed of transmission from the end user to the Internet.
Wi-Fi hotspot	Wireless Fidelity: Generic term referring to any type of IEEE 802.11 wireless network. A hotspot is a small geographic area in which users

	can gain access to a Wi-Fi network which in turn connects to the Internet.
Wireless service	Telephone, Internet, data, and other services provided to customers through the transmission of signals over networks of radio towers.
Wireless service provider	Provider of wireless service (see above).
WISP	Wireless ISP: A company that provides end users with wireless access to the Internet, most commonly by using radio spectrum designated for unlicensed use.

Customer Response

Publication: *Internet Access Services: Status as of June 30, 2019*

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2. Please rate the report: Excellent Good Satisfactory Poor No opinion

Data accuracy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Data presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timeliness of data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Completeness of data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Text clarity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Completeness of text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Overall, how do you rate this report? Excellent Good Satisfactory Poor No opinion

	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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4. How can this report be improved?

5. May we contact you to discuss possible improvements?

Name:

Telephone #:

To discuss the information in this report, contact: 202-418-0940 or for users of TTY equipment, call 202-418-0484		
Fax this response to 202-418-0520	or	Mail this response to FCC/OEA/IAD, Mail Stop 1600 F Washington, DC 20554
Scan and email to OEA-IADreports@fcc.gov		